Western Industry

January 1954

The Western Outlook

in perspective . . .

overall industrial trends

in detail . . .

markets, materials, methods
in more than 80 industries

Facts you can use

6th Annual Review & Forecast

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Cabco containers are a product of the California Barrel Company, Ltd., the West's foremost designer and manufacturer of wooden shipping containers

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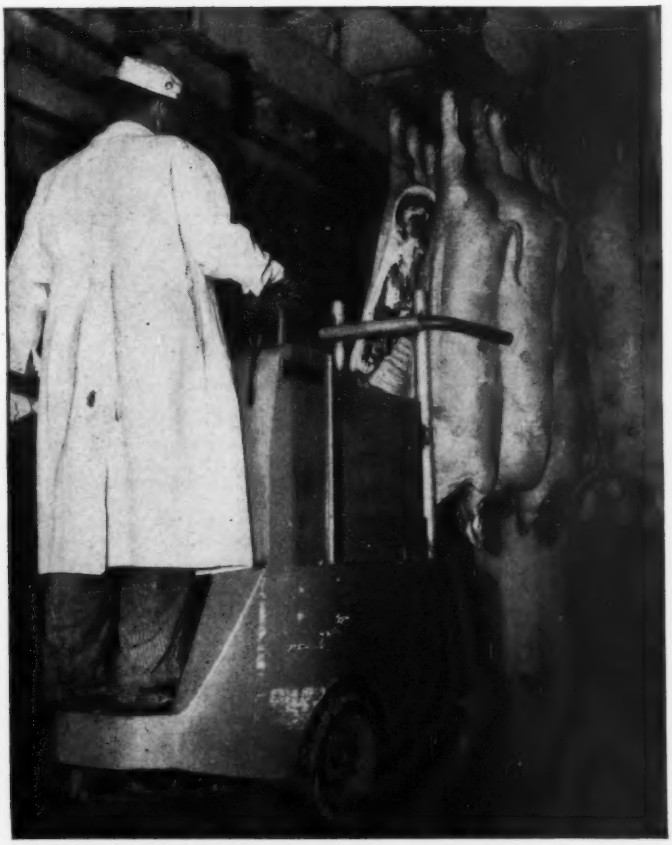
FREE TW ANALYSIS can save you as much as 50% on industrial tires



OILY FLOORS IN YOUR PLANT? Industrial tires go to pieces in a hurry unless you use an oil-proof compound in your tires. Ask the BFG man for recommendations.

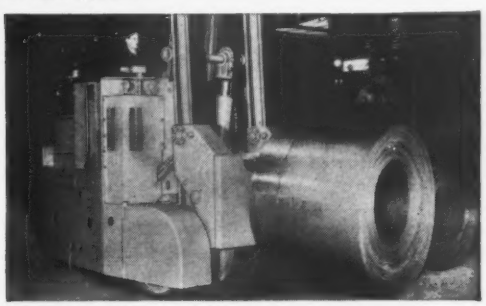
ROUGH HAULING SURFACES? They can slash tire life, increase maintenance costs and foul up work schedules. The BFG man can show you how to get maximum tire life.

FRAGILE LOADS? Materials handling costs skyrocket when fragile materials break. Maybe your handling methods, equipment or tires are to blame. A Tire & Wheel Analysis can help you.

Here's how to start cost cutting

Mail the coupon below for free information on the B. F. Goodrich Tire and Wheel Analysis Plan. Without obligation you can have a trained BFG man study your operations, analyze equipment, loads, hauling surfaces and handling methods. He will tell you what type and size tires, what tread design and compound will serve you best. Because BFG makes a *complete* line of industrial tires, you get impartial recommendations, plus maintenance suggestions that alone may save you hundreds of dollars. Mail the coupon today! A special TW Analysis Plan is available for manufacturers of materials handling equipment.

OUTDOOR OPERATIONS? Tire problems are different from those of inside hauling. The BFG man will show you how to pick the right type tire.



HEAVY LOADS AND EQUIPMENT? Overloads can cause industrial tires to fail prematurely. Your B. F. Goodrich man knows how to match the tire and the load.

Specify B. F. Goodrich tires when ordering new equipment

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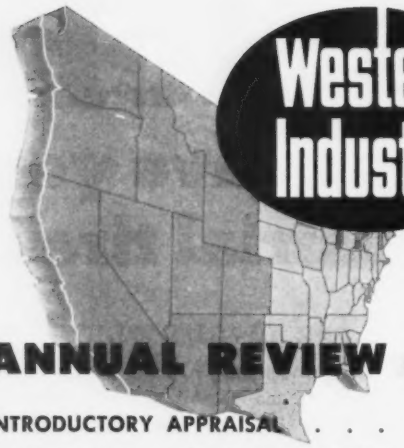

Western Industry

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Many furnaces are "tripling"... original tap holes are lasting up to 80 heats without repiping . . . production records are being broken, with extra tonnage every hour.

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DELTA Abrasive Finishing Machines Let Your Operator Finish Parts While His Machine Is Cycling Automatically

Equip your machine operators with fast, precision DELTA abrasive finishing machines. While the machine is cycling, your operator will be deburring and finishing machined parts . . . grinding and sharpening cutting tools . . . preparing rough stock for tooling. Yet, there is no additional labor cost. This man, otherwise, would be idle. Finishing costs are cut . . . production increased.

AND, these DELTA abrasive finishing machines are rugged, precision power tools. Built to give long, trouble-free service, there is virtually no maintenance other than periodic changing of the inexpensive abrasive belt or disc. Unexcelled for versatility, they are light in weight and can be taken anywhere in the shop for quick, accurate finishing on any production or maintenance job.

DELTA 6" ABRASIVE BELT FINISHING MACHINE

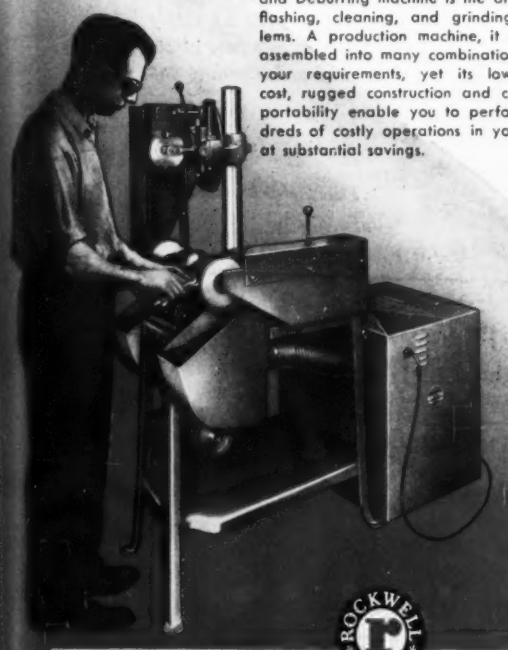
Built to withstand the punishment of continuous shop operation, DELTA'S 6" Abrasive Belt Finishing Machine is ideal for deburring and finishing larger machined parts and components. Completely adjustable, the table tilts 45° from the belt, 20° away from it, and the belt drive itself may be placed in either vertical or horizontal positions. Practically any grinding, deburring, and finishing job can be handled on this tough, versatile machine.

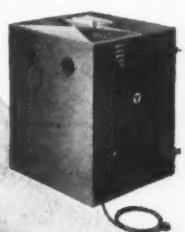
DELTA MILWAUKEE

DELTA QUALITY MAKES THE DIFFERENCE

DELTA BELT GRINDING POLISHING AND DEBURRING MACHINE

DELTA'S new Belt Grinding, Polishing, and Deburring machine is the answer to flashing, cleaning, and grinding problems. A production machine, it can be assembled into many combinations to fit your requirements, yet its low initial cost, rugged construction and complete portability enable you to perform hundreds of costly operations in your shop at substantial savings.





DELTA DUST COLLECTOR

The DELTA Dust Collector is a self-contained, low-cost, portable unit, that can be attached to all types of abrasive machines. A powerful fan sucks both fine and heavy dust and small particles through a permanent, perfected air filter. The larger particles fall into a pan and are easily removed. Worker's health is protected, and harmful dust is kept away from machinery.

DELTA ABRASIVE DISK FINISHING MACHINE

For fast, accurate finishing where space is at a premium, DELTA'S Abrasive Disk Finishing Machine cannot be equalled. With or without the stand, this precision machine can be readily moved to any place in the shop or on the production line. The disk, specially machined to insure proper adhesion of abrasive disks, fits directly to the end of the motor shaft. The table, grooved for miter gage, locks at any angle up to 45° away from the disk and 20° toward it.

ROCKWELL

DELTA QUALITY POWER TOOLS

Another Product of **Rockwell**

Hundreds of manufacturers, equipping their machine operators with DELTA Abrasive Finishing Machines, are realizing increased production and substantial savings in per unit costs. Get the whole story from your DELTA dealer, and send for the catalog today. Delta Power Tool Division, Rockwell Manufacturing Company, 686A N. Lexington Avenue, Pittsburgh 8, Pa.

PRODUCTION RESUMED IN 3 DAYS

after $1,000,000 fire at C&D Batteries, Inc.

C & D President, Leon A. Doughty pulls switch to start charging operations.

C & D's block-long plant in Conshohocken, Pa. at the height of the fire, Sunday, November 29.

Despite a $1,000,000 fire that destroyed the main buildings, offices, engineering department, and laboratory of C & D's plant on Sunday, November 29, 1953, production was resumed in three days.

On Tuesday, December 1, space was leased in a nearby plant for setting up new production facilities. On Wednesday, December 2, new batteries that had escaped the fire were being charged on new lines, and grid casting was begun next morning.

The new facilities were in operation on December 10. The salvaged portions of the main plant and the leased facilities were combined to achieve full production by Christmas.

We thank our customers for their patience in bearing with us during delays in shipping, and assure them that the high quality of C & D products is being maintained. *We are deeply grateful to our many friends who have generously given us their kind understanding and support.*

Philadelphia Inquirer Photos

Two Men Seized in Bakery Holdup

Two holdup men were captured by police late last night, within 15 minutes after they robbed a bakery, on Dryrum ave. near Oster st., of $122.

The robbery occurred in Vern's Bakery, at 9718 Dryrum Aven[illegible] the place at 10:35 P. M. The younger one held his hand in [illegible] coat pocket[illegible]

Auto Strikes Man Carrying Box

A man carrying a bo[illegible] 93rd st. near [illegible] short[illegible] afte[illegible]

30 M[illegible] Stick

PAN[illegible] day) ([illegible] Korea[illegible] refused [illegible] ing to [illegible] resiste[illegible] tion.

It wa[illegible] home" [illegible] have [illegible] man. AWA[illegible]

W[illegible] more [illegible] cans [illegible]

M[illegible] B. O[illegible] Cor[illegible] sio[illegible] nc[illegible] pa[illegible] in[illegible]

[illegible] toda[illegible] the [illegible] fate[illegible] conf[illegible] TA[illegible]

E[illegible] conf[illegible]

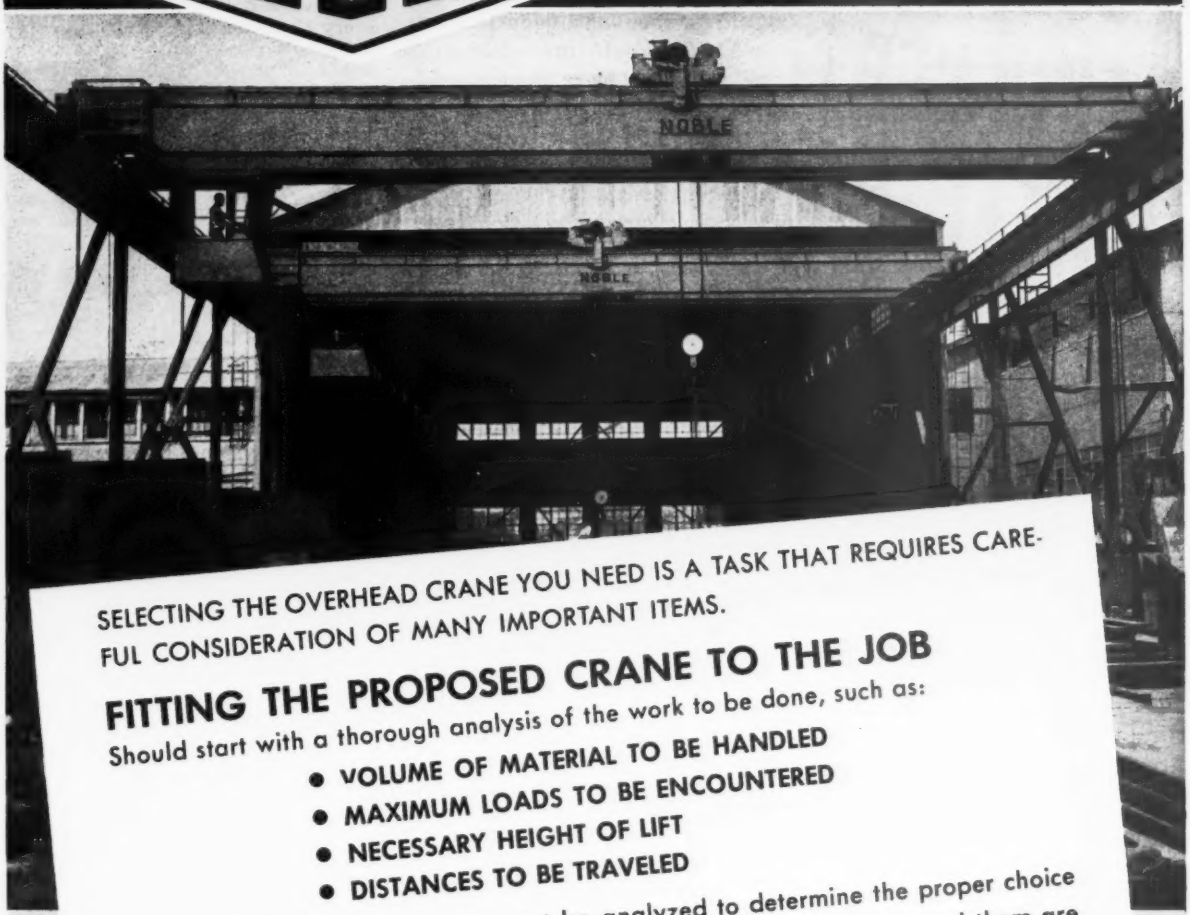
A[illegible] the[illegible] on[illegible] pr[illegible]

C&D BATTERIES, INC.

of Conshohocken, Pa.

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

NOBLE CRANES



SELECTING THE OVERHEAD CRANE YOU NEED IS A TASK THAT REQUIRES CAREFUL CONSIDERATION OF MANY IMPORTANT ITEMS.

FITTING THE PROPOSED CRANE TO THE JOB

Should start with a thorough analysis of the work to be done, such as:

- VOLUME OF MATERIAL TO BE HANDLED
- MAXIMUM LOADS TO BE ENCOUNTERED
- NECESSARY HEIGHT OF LIFT
- DISTANCES TO BE TRAVELED

The character of the operation must be analyzed to determine the proper choice of motors and controls. The motors and electrical equipment that control them are one of the most important features on the crane.

A thorough knowledge of the varied types of motor controls and their application is very necessary to design for the most efficient operation.

NOBLE CRANES ARE ENGINEERED BY MEN WITH MANY LONG YEARS OF EXPERIENCE WITH THE TECHNICAL AND PRACTICAL PHASES OF CRANE DESIGN.

Our staff is always available for consultation, and can provide valuable assistance in planning both methods and equipment to meet your particular needs.

WE SPECIALIZE IN THE TYPE OF CRANE NEEDED TO DO EXACTLY THE JOB YOU WANT IT TO DO. AND DO THAT JOB EFFICIENTLY WITH CONTINUED ECONOMY AND SAFETY.

Write us for a copy of our new crane catalog.

C16

NOBLE COMPANY

1860 SEVENTH STREET · OAKLAND 20 CALIFORNIA

OVERHEAD MATERIAL HANDLING EQUIPMENT

COLD FINISHED STEEL BARS

No. 1 of a Series

SIERRA DRAWN STEEL CORPORATION

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. . . of the Northwest
1917 Shaffer Street • Box 65
Boeing Field, Seattle
RAinier 5961
Quality and Service for Western Industry

ONLY INDEPENDENTLY OWNED COLD FINISHING BAR MILLS IN THE WEST

with
Complete Metallurgical Service
Complete Engineering Service
Production Flexibility
Fast Delivery

Let's talk for a moment about cold finished steel bars. Frequently, the term "cold rolled" is used to describe this product but this term is actually a misnomer. "Cold finished" is a generic term used to designate three classes of cold processed bars, namely, cold drawn bars, turned and polished shafting, and ground and polished bars (the latter usually being either drawn or turned prior to centerless grinding). Cold rolling is used only in a minor way on bars for special shapes which can be manufactured in no other way.

FOUR FACTORS TO BE CONSIDERED

There are actually four really important facts about cold finished bars which distinguish the product from all others. These four facts or characteristics are the foundation of the cold finished bar business and are the big reasons why industry uses cold finished bars. Selection of the product, therefore, and its economical use and handling requires an understanding of the application intended from the standpoint of one or more of these characteristics.

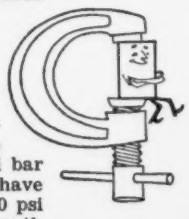
FINISH

The first is finish. This is easy to see and define. One look at a cold finished bar compared to a hot rolled bar is sufficient to show the advantage of the finish on the cold finished bar. A hot rolled bar is finished on the mill at anywhere from 1600° F. to 2200° F. Steel at such elevated temperatures forms iron scale which adheres to the surface, is hard, abrasive, disagreeable to handle, discoloring and dirty. Where it flakes off it leaves rough irregular pits and marks on the surface. When the hot rolled product is pickled in sulphuric acid, this scale is entirely removed. The bar is then drawn through a carbide die which compresses the surface making it smooth and shiny. Subsequently, it is polished further and straightened. The bar now has a smooth shiny surface suitable without further dressing for thousands of applications such as small shafts, pins, studs, nuts, and many, many others.

SIZE AND CONCENTRICITY

The second is size and concentricity. Going back to the hot rolled bar again, when it is rolled at elevated temperature, it is plastic and is found to vary greatly in size, as much as plus and minus .008" to plus and minus .020". Also it is oval or egg-shaped. When the same bar is cold drawn, the drawing die is round, and maintained to specified size. Thus, standard size tolerance of a cold drawn bar is plus nothing minus .002" in sizes up to 1", inclusive, and only increases .001" for every 1" in diameter. Commercial tolerances on concentricity are ½ the size tolerance which, of course, is very small. The advantage of this size and concentricity is obvious since many applications are found where such tolerances are plenty close enough for field service applications. Small motor shafts, washing machine shafts, threaded parts, and studs are all examples of such parts.

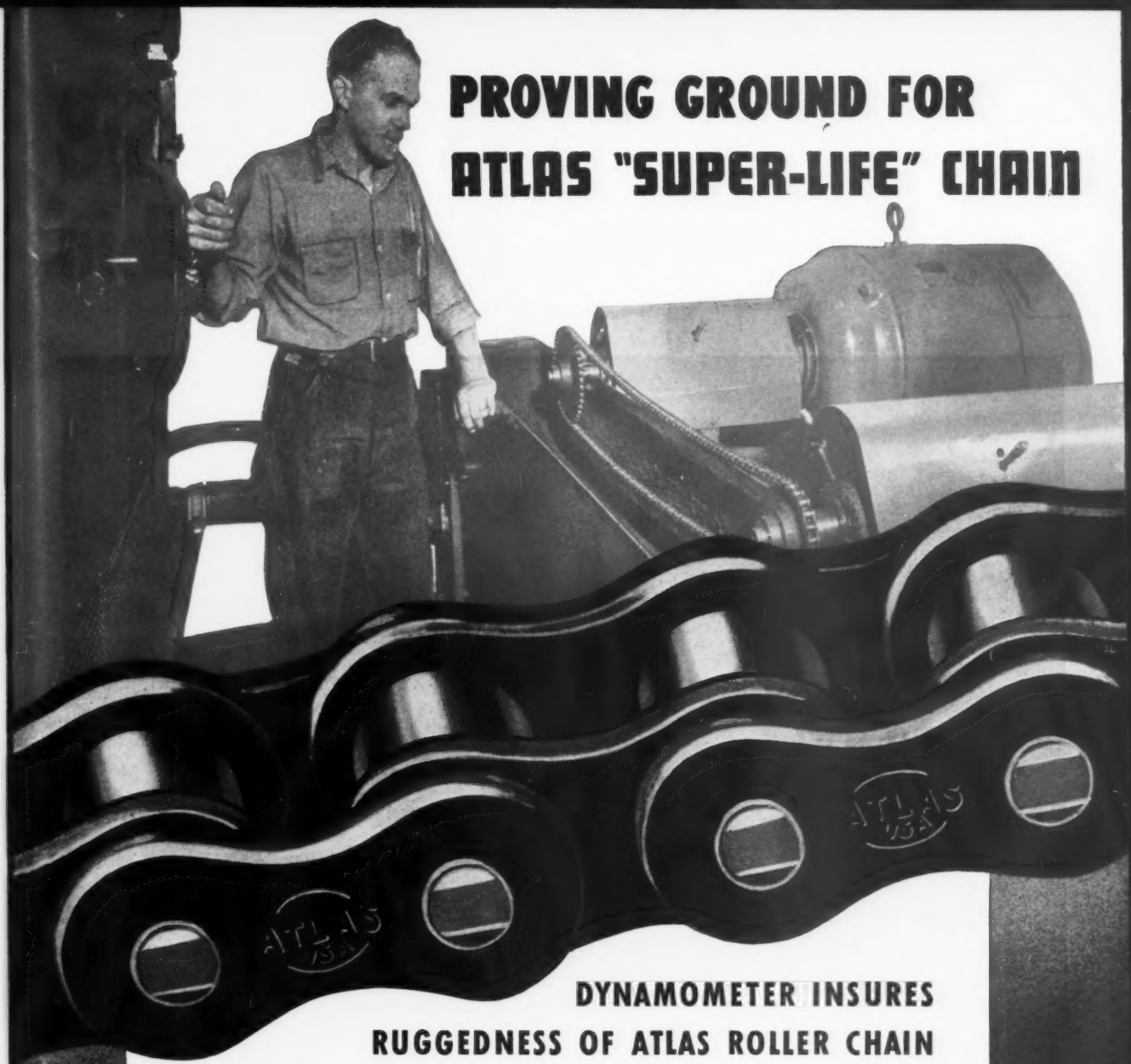
MECHANICAL PROPERTIES



The third is mechanical properties. A hot rolled bar will be found to have a tensile of 50,000 psi and a yield strength of 30,000 psi. After cold drawing this same bar will show a tensile of 70,000 psi and a yield of 60,000 psi. These are, of course, for illustration only. Cold drawing increases tensile perhaps 20% while it increases yield perhaps 50% or more. This depends on many factors, such as steel grade, quality, etc. The importance of this increase in strength is that it gives a product stronger than hot rolled or mild steel and many engineers find cold drawn steel to possess just the strength they want for field service requirements. This means no heat treatment, less handling, lower costs, less finishing, and many such advantages.

MACHINABILITY

The fourth is machinability, and this is probably the most important of all to the user. When you are making parts, whether it is 100 or 1,000,000, cost is the big thing. The speed at which you can make them, the efficiency of the machine, downtime, secondary finishing operations, and tool life are all factors determining part cost and are what we can term "machinability". We have all heard a machine operator say "this steel is too hard to cut." Nine times out of ten he really means "too soft." It is gummy or mushy; it tears or pulls. When this same steel is cold drawn, it provides a crisper structure which cuts a great deal freer, breaks the chip just ahead of the tool and gives a much improved finish. The tools stand up much better because a springy chip will clear the tool and not abrade it or cause it to heat. Part finish is so much better that secondary operations of finishing can frequently be eliminated. All of these factors reduce costs of parts. For minimum cost and maximum production a cold drawn bar should always be used. The factors above apply to all grades of steel equally.



PROVING GROUND FOR ATLAS "SUPER-LIFE" CHAIN

DYNAMOMETER INSURES RUGGEDNESS OF ATLAS ROLLER CHAIN

In the Atlas laboratories, Dynamometer tests give final proof of the strength, life and economy of Atlas "Super-Life" Roller Chain. Here the results of all Atlas specifications and methods of manufacture are checked for top performance, under varying conditions of speed, load, and sprocket characteristics.

The Atlas Dynamometer provides a complete test of Atlas Chain's wearability, fatigue life, load-carrying capacity, and ability to withstand shock. As a result, you can be certain that every link of Atlas Chain will deliver more years of trouble-free service, more production for your power transmission dollar.

For greater efficiency, more economy, on every power drive, install Atlas "Super-Life" Roller Chain—the chain that speeds up production, cuts down maintenance. Write today for the new Atlas Catalog and Handbook.

ATLAS CHAIN & MANUFACTURING CO.
PHILADELPHIA 24, PENNA.

ATLAS

ATLAS ROLLER CHAIN

Here's how U·S·S are used in

Inside of tank is coated with porcelain

This automatic head welder was designed and built by Fowler Manufacturing Co. It welds two ¼-inch steel heads on the 10-gauge steel water heater tank.

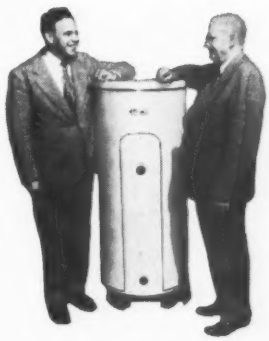
Outer jackets leave the drying oven with a durable, baked enamel finish.

Steel Sheets
making Fowler Water Heaters

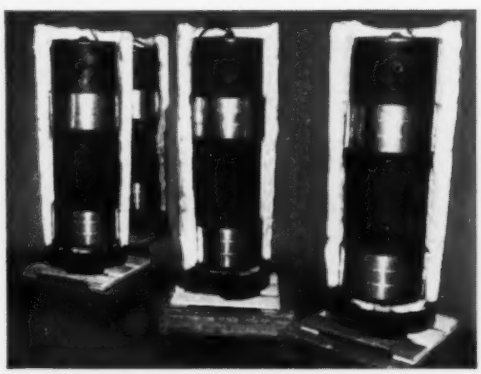
The Fowler Manufacturing Company, Portland, Oregon, is one of America's pioneer water heater manufacturers, with over 35 years of experience. They use large tonnages of tailor-made, high-quality U·S·S Steel Sheets each year in making clothes dryers, and gas and electric water heaters for homes, farms, and industry.

Steel designed for a specific purpose

From the very beginning, steel from Columbia-Geneva is tailor-made to do the best job for you. Knowing the end use for your steel, and working within the appropriate standards for your particular application, Columbia-Geneva metallurgists and other trained technical personnel are able to rigidly control the steel from start to finish. The results of this extra attention show up in the high quality of your finished products, and in the lack of rejects on your production line. For additional information or technical assistance, call your nearest Columbia-Geneva District Sales Office, or write Columbia-Geneva Steel Division, 1403 Russ Building, San Francisco 6.



Mr. P. L. Fowler (right), President of Fowler Manufacturing Co., with one of the Columbia-Geneva Technical Field Representatives who are always available to help solve your steel problems.



In final assembly, heavy Fiberglas insulation is sandwiched between tank and outer jacket.

22-gauge U·S·S Steel Sheets are rolled to make one-half of the outer jacket for the Fowler Water Heater.

U·S·S Steel Sheets

Columbia-Geneva Steel Division · United States Steel Corporation

UNITED STATES STEEL

Our Man
IS YOUR MAN

The M & T representative is backed by a line of welding materials and equipment as complete as any available anywhere. In addition, he is a seasoned, practical welding engineer, well qualified to be of genuine help on your welding problems.

If the latest in welding techniques, equipment and materials can assist you, *our man is your man*—for orders or advice.

DETINNING • THERMIT WELDING • METALS and ALLOYS • ARC WELDING—Materials and Equipment CHEMICALS and ANODES for Electrotinning CERAMIC OPACIFIERS • STABILIZERS for Plastics TIN, ANTIMONY and ZIRCONIUM CHEMICALS

West Coast Office:
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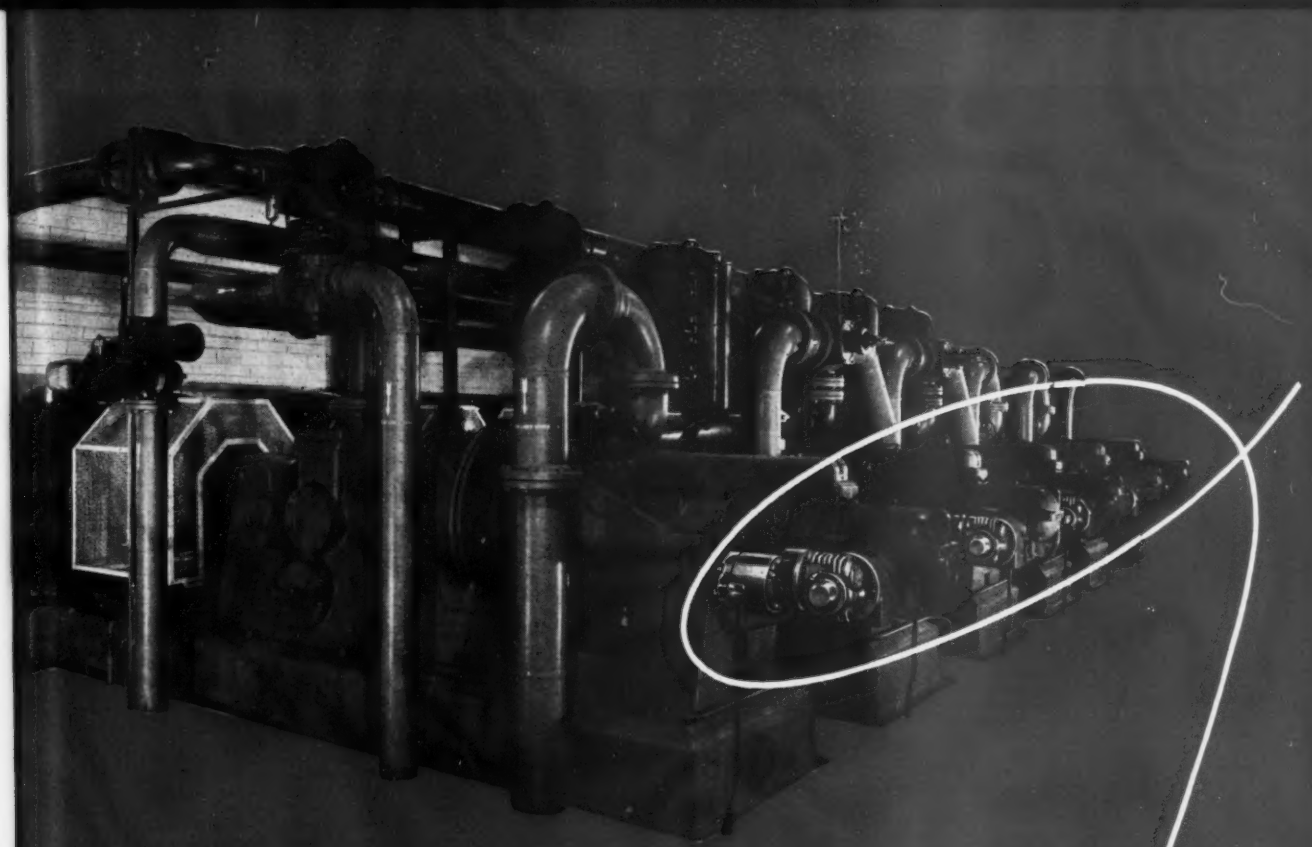
SOUTH SAN FRANCISCO,
CALIFORNIA

METAL & THERMIT CORPORATION

100 EAST 42ND STREET • NEW YORK 17, N. Y.

Murex® Electrodes · Arc Welders · Accessories



When you must have slow speed power, always consider first MASTER Right Angle Shaft Gearmotors. They're very compact . . . low in cost . . . safe . . . and so easy to use.

And nowhere else can you get anywhere near the wide range of selection that you have in MASTER Right Angle Gearmotors. They're available in sizes ⅛ to 25 Horsepower for all electrical specifications and in splash-proof, enclosed or explosion-proof construction. Gear reduction ranges up to 430 to 1 with the countershaft in either horizontal or vertical positions. In addition these gearmotors can be supplied with integrally built electric brakes . . . three types of variable speed units . . . and with fluid drive units for cushioned power.

Try them . . . you'll find they're the horsesense way to get slow-speed horsepower.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

you can't beat them for compact slo-speed power

WESTERN BRANCHES

DENVER · SALT LAKE CITY · PORTLAND · SPOKANE · SEATTLE · LOS ANGELES · SAN FRANCISCO

25 YEARS OF SERVICE

1954 is Consolidated Freightways' 25th Anniversary Year.

Twenty-five years of business life makes us a veteran in the comparatively young motor freight industry.

Since CF pioneering days of 1929 we have grown to be one of the nation's leading motor freight systems. We say this humbly—for our beginnings were very small. We have been fortunate in sharing in the phenomenal growth of the territory we serve.

Today, thousands of shippers are served daily over 19,000 miles of routes. Our fleet includes 2600 units of rolling stock. Last—but far from least—there are 3,850 trained, friendly men and women on the CF team, many of whom have been with us since the beginning.

For the future, our policy continues to be one of *responsibility*...and of providing complete transportation and distribution services throughout the West.

MAY WE SERVE YOU?

CONSOLIDATED FREIGHTWAYS

GENERAL OFFICES: P. O. Box 3618, PORTLAND 8, OREGON

Putting the roses on parade

Think you have problems? How would you like to engineer a display like the one pictured above, using nothing but living, blossoming flowers?

This is no mythical situation. It's a real one—one that participants in the New Year's Day Tournament of Roses Parade at Pasadena must face—year after year.

The most satisfactory method they've found to secure these blossoms (without damage) to floats calls for a 3M adhesive. And it solves their problem—handsomely! Whether it's fastening delicate blooms to floats or helping to fabricate complex products like automobiles, 3M *engineered* adhesives can do the job. That's why more and more manufacturers in *all* industrial fields look to 3M for the practical solution to *all* their bonding problems.

See what adhesives can do for you... If you're interested in discovering what adhesives can do for you, write today for a free brochure which provides more information on many 3M products. Address your request to 3M's West Coast Adhesives and Coatings Division Office, 6411 Randolph St., Los Angeles 54, California.

3M COMPANY

Serving the West Coast

MINNESOTA MINING AND MANUFACTURING COMPANY

ADHESIVES AND COATINGS DIVISION: 6411 Randolph Street, Los Angeles 54, Calif. • 1242 Sixth Avenue, Seattle 4, Wash. • 450 Alabama Street, San Francisco 10, Calif.

FOR SALE!

This aluminum oxide wheel (DA60-H9-V20) for tool room grinding was developed by Carborundum to sell in a popular price bracket, yet it compares in quality and performance with any premium-priced wheel on the market today. It's only one of 4973 different types, sizes, grits, grades and bonds of grinding supplies available in the warehouses of Pacific Abrasive Supply Co. to aid you in any grinding problem.

Yours for the asking.

Get your complimentary copy of anyone of these eight booklets containing information of particular interest to you.

Order by number...

2. RESIN INDUSTRIAL CLOTH.
3. MX PRODUCTS.
4. ABRASIVE PRODUCTS FOR THE FOUNDRY.
6. METALLIC CUTTING OFF WITH ABRASIVE WHEELS.
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Have you availed yourself of Pacific Abrasive Supply Co's "Round Table?"

For immediate delivery on abrasives of any kind, call...

PACIFIC ABRASIVE SUPPLY CO.

34 years of abrasive distribution and engineering experience.

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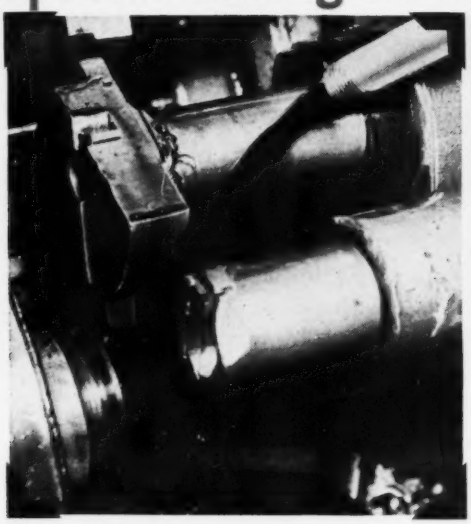
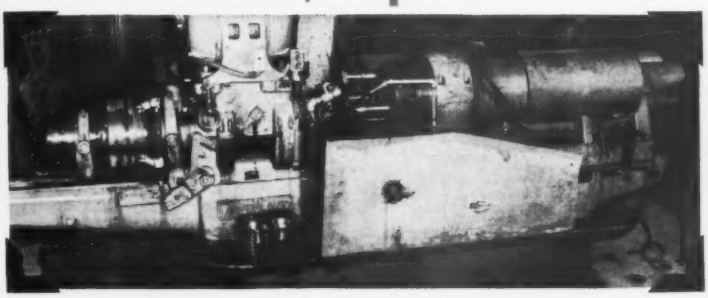
STANDARD ENGINEER'S REPORT

DATA

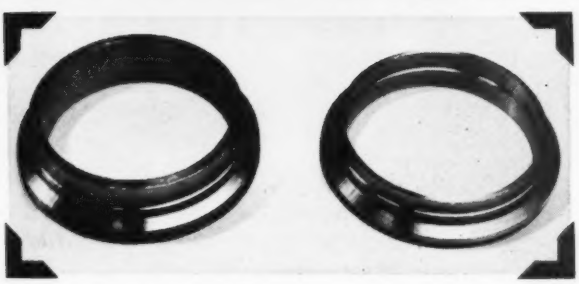
LUBRICANT	Calol Cutting Oil 39-DA
UNIT	Automatic screw machines 1/2" to 5¼"
LUBRICATOR	Circulating
SERVICE	Machining spun cast stainless steel
FIRM	Speedway Engineering Co., Montebello, Calif.

Special cutting oil boosts tool life, improves finish!





WHEN CALOL CUTTING OIL 39-DA replaced a competitive oil on this 4½-inch Cleveland Automatic Screw Machine, it greatly increased tool life, improved the finish, and produced the close tolerances required in machining spun cast stainless steel. Tool life on this machine now averages 8 hours. The aircraft flange being worked at left, requires a 100 micro-inch finish and a final tolerance of 0.0015 inch. The Speedway Engineering Company has found Calol Cutting Oils completely uniform and able to handle efficiently any work in their shop.



THE HIGH FINISH OBTAINED with Calol Cutting Oil 39-DA is shown in this comparison photograph. The spun cast stainless steel flange (left) has been rough cut, while the other (right) has had final machining. This shop also uses Calol Cutting Oils on engine and turret lathes, milling machines, and drill presses.

FREE CATALOG: "How to Save Money on Equipment Operation," a handy booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

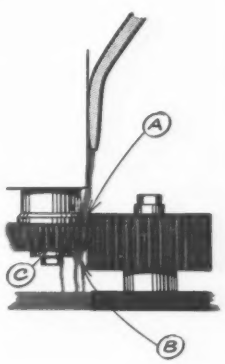
How to increase efficiency in all metal-cutting operations

Use the correct Calol Cutting Fluid for any operation from grinding to broaching. Recommendations for each are made from actual working results.

A. Have high cooling and lubricating qualities—minimize "built-up edge" and promote good finish.

B. Flush away cuttings readily.

C. Protect machine and work against rusting and corrosion.



STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

These Intricate Parts are PRECISION-CAST

ECONOMICALLY TO CLOSE DIMENSIONS

Housing for Rod Feeder

Internal Operating Lever

These two parts—vital to a starting-rod feeder for a hand-scarfing blowpipe—are produced in quantity by HAYNES precision-investment casting. Both parts are too intricate in shape for accurate production by conventional casting methods. And since they are made from stainless steel, the cost of machining the parts in quantity would be prohibitive.

HAYNES precision casting is an ideal method for mass-producing parts that must be made from an alloy difficult to fabricate into intricate shapes by ordinary methods. Sound, smooth castings are produced to such close dimensional standards that the need for finishing operations is minimized. For more information on the types of parts best suited to this process, and for tips on designing parts to be cast by this method, write for the booklet, "Investment Castings."

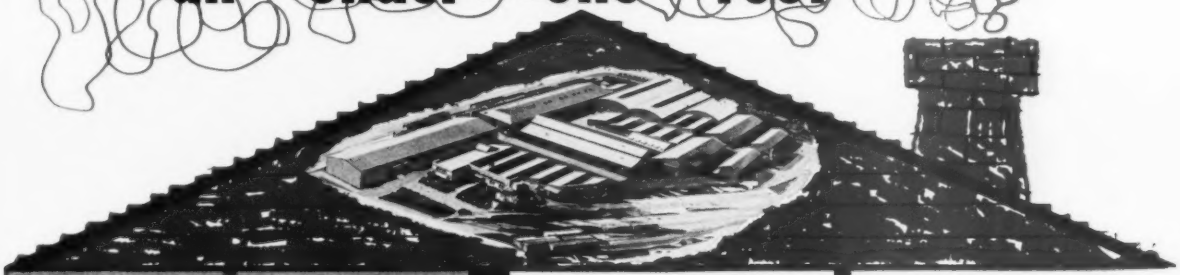
The efficiency of the starting-rod feeder on this hand-scarfing blowpipe is partly due to the use of HAYNES *investment castings for the critical parts of the assembly.*

HAYNES TRADE-MARK *alloys*

"Haynes" is a trade-mark of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles—New York—San Francisco—Tulsa

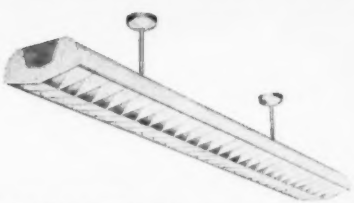
all under one roof



CIRCL-LITE CX-1000-S

SCHOOLS

This concentric ring indirect fixture designed for low ring brightness and high efficiency. Open rings prevent dirt or dust accumulation. Deluxe non-turn hanger and bowl supports approved EARTHQUAKE PROOF.



COLLEGIATE PM-284

OFFICES

NE-2661

FACTORIES

Ever-popular open end fluorescent. This fixture, with its porcelain enameled reflector will not be damaged by abrasive dust or oily vapor and naturally carries the RLM label.

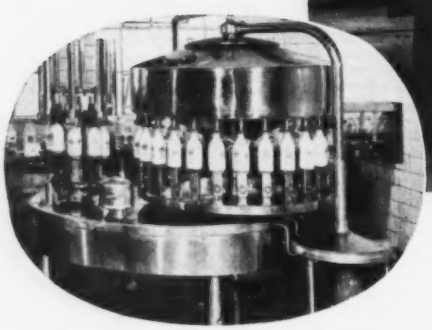
MASTER

OUTDOORS

SMOOT-HOLMAN

The Dairy Cooperative Association, Portland, Oregon, gains payload and does the hauling job right with White 3000s.

RIGHT for the job



Modern dairies depend on the high speed efficiency of special machines designed for a specific job.

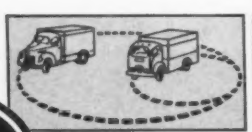
WHITE 3000

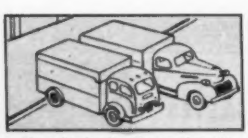
Today White brings to your hauling operations a new standard of truck performance—matching the efficiency of modern industrial machines. You owe it to yourself to discover the White 3000—America's *machine tool of transportation.* Call your local White representative.

THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO.

White 3000

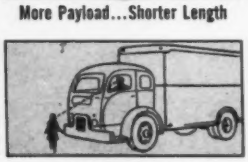
Factory Branches, Distributors and Dealers Everywhere


Greater Maneuverability


More Payload...Shorter Length

New Cab Saves Driver Time

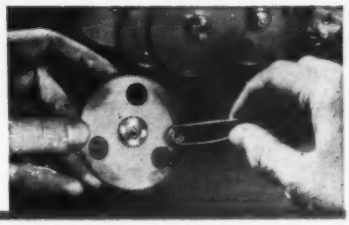
More Efficient In Traffic


Better Visibility...Safety

Low Loading Height

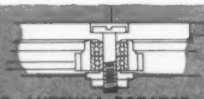
FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

HERE'S HOW



BENDIX RADIO AND AKELEY CAMERA

cut frictional torque, save space . . . with



RADAR ANTENNA ROTATOR
Designed by Bendix Radio and manufactured by Akeley Camera. Uses MPB miniature ball bearings.

OPERATING CONDITIONS — low frictional torque at gear speeds of 1065 and 1200 rpm, extremely limited space, plus necessary prevention of radial play and tilting of gears . . Resolved by use of 2 ultra-precision MPB bearings, o.d. .3125 in., bore .1250 in.

Miniature Precision Bearings

MPB bearings can help you

Design engineers, designers of precision equipment of all types — here is the most complete information ever offered on miniature ball bearings. It may help you solve a design problem . . . or spark a new-product-idea. Write on your letterhead for new MPB catalog WI 54a.

Also available to qualified groups: the 16mm, sound-color film, "Mighty Miniatures" — the story behind the production of ultra-precise MPB bearings.

Miniature Precision Bearings, Incorporated
Keene New Hampshire

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UNITED STATES STEEL AT WORK IN THE WEST—the Meier & Frank Co. Building, Portland, Oregon

NORTHWEST LANDMARK...with a framework of steel!

Famous throughout the Pacific Northwest as "the building Portland grew up around", Meier & Frank Co. stands today as one of America's great stores.

Construction was begun in 1907, and major additions were made in 1931. Foundations and framework of the building are steel . . . of which an important share came from the mills of Columbia-Geneva.

For any job, big or small—Columbia-Geneva for years has made steel of many types. Of course, some of these products are in short supply. But we hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

Columbia-Geneva Steel Division • United States Steel Corporation

USS

UNITED STATES STEEL

$12.65 on the shelf... $32.45 in the line

Like most installations, a pipe line is part materials and part labor. And the labor part has been getting bigger and bigger.

This growing labor cost is no small consideration when buying piping equipment. It costs just as much to install an inferior valve as a good one. And it costs a lot more to service the inferior one. For a single item, that difference might not be significant. But single items don't make a piping system. Instead, you may use and have to maintain hundreds, even thousands of individual valves.

Simple arithmetic tells why today it's more important than ever to buy valves that last longer and need fewer repairs. That's why Crane quality makes Crane the line for the thrifty buyer... it's why more Crane Valves are in use than any other make.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Western Industry

EDITORIALS

Destiny is determinable

ONE THING about the West's destiny is certain, that its population will continue to grow tremendously. But beyond that, opinions begin to differ. Many developments will follow, but what will they be?

A dictionary definition of destiny is "the pre-determined course of events often conceived as a resistless power or agency." Applying that definition to the West, would you say that its policies in water conservation and electric power development, its supply of natural gas, the utilization of its vast reserves of coal, its use of highways and railroads for freight movement, the residential encroachment on logical industrial areas, just to name a few things, are a "pre-determined course of events?" Do the thoughts and acts of the West's people have nothing to do with the West's future?

Carrying the matter one step further, what determines the thoughts and acts of the West's people? Is it blind drifting? Is it prejudice? Is it intuitive intelligence? Is it intelligence supplemented by and tempered with information? Is it recognition of the fact that the West needs to know more about itself? Is it translation of that recognition into action?

WESTERN INDUSTRY has accepted the responsibility of doing its part in letting the West know more about itself, its problems and some of the possible solutions. This January issue, our sixth annual Review and Forecast, is one evidence of that acceptance. But there is far more to be done than can be put into the pages of a magazine. What organizations in the West will accept the challenge to look beyond their own back yards and realize that the destiny of the West *as a whole* is not a "pre-determined course of events" nor a "resistless power or agency," but in many phases can be intelligently shaped?

In appreciation

WESTERN INDUSTRY owes a debt of gratitude to a large and growing group of Westerners who contribute the information and ideas that enable us to publish our annual Review and Forecast. Without their help we could not even begin to present the broad picture of the West, supplemented by a mass of important and enlightening detail which the reader will find in the pages of this issue.

But there is a vastly larger group of Westerners whom we obviously cannot get around to reaching individually. They undoubtedly could supply equally valuable information, and WESTERN INDUSTRY hereby requests each and every reader to pass on to us, of his own accord, facts and ideas which he believes should be incorporated into the Review and Forecast.

Criticisms of the Review and Forecast are also welcome. They stimulate us to do a more thorough job each year.

Time marches upward

ON THE WHOLE, there were not many strikes in the West last year, which we are inclined to attribute to the fact that we are coming of age in our industrial relations, a belief which is strengthened by the opinions of some competent authorities.

People in the West may feel like doing a little chest-beating, feeling that we are more mature in our industrial relations than the rest of the country. But to determine this beyond question will require more historical perspective than we now possess.

Nevertheless, the march of time has rolled up enough history for management to realize that collective bargaining is a law of the land which cannot be repealed until something higher takes its place. Management is fast learning that it has to live with union labor. Also, the more farseeing union leaders are discovering that they must live with management, and that the purification of motives and acts which management has been gradually undergoing must inevitably apply just as much to labor.

"Here's why we picked UNION's 210 for oil treating."

Howard A. Cusic,
purchasing agent,
Multnomah Plywood Corporation,
Portland, Oregon

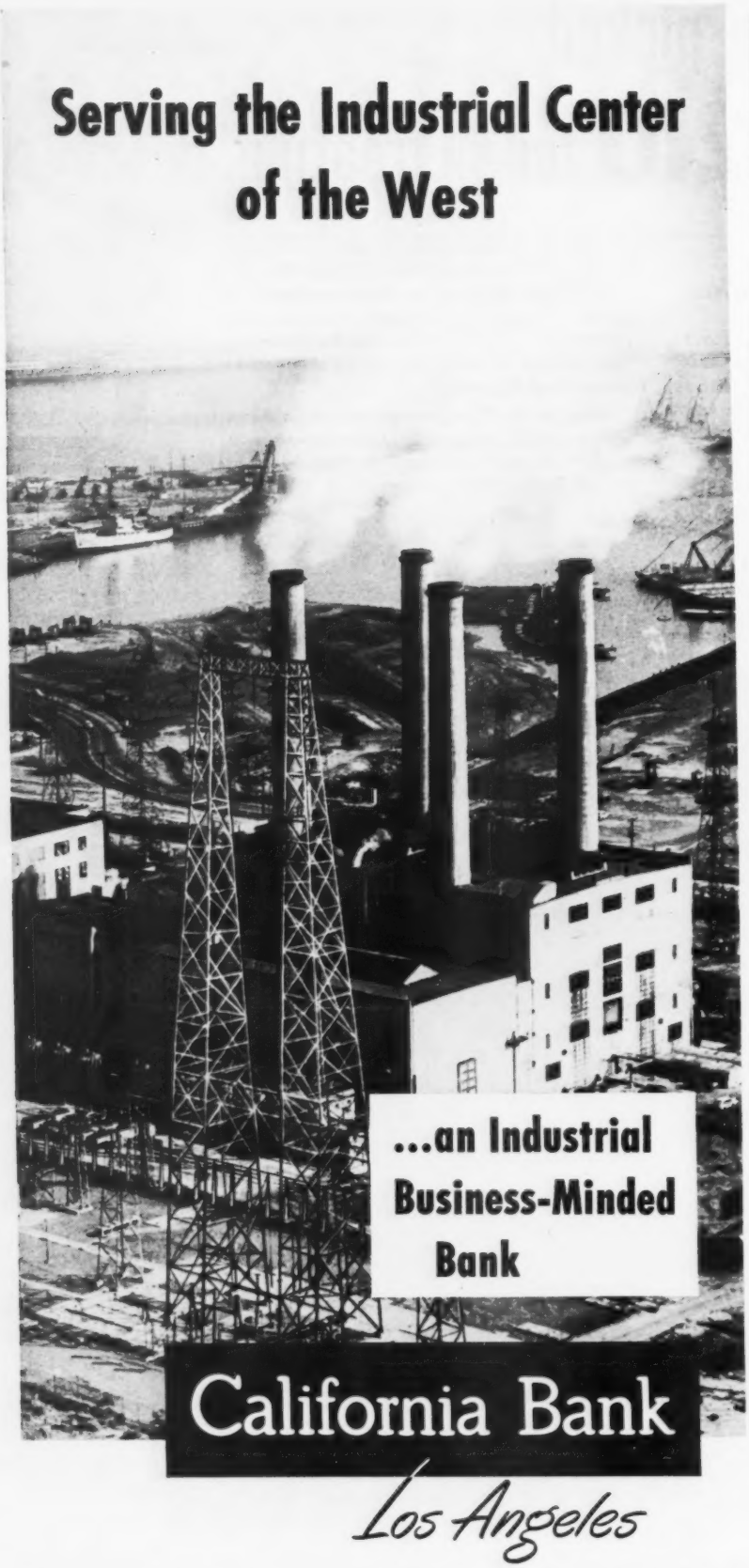
"Increased production of our oiled Plyform panels for concrete forms made it imperative for us to find the most effective and economical oil we could purchase for this purpose.

"After studying our problem, our Union Oil representative recommended Union's 210 mineral oil. It proved to be the best of all the oils we'd tried on our job. Since we started treating with Union our costs have dropped, our panels are cleaner and easier to handle, and our customers have nothing but good things to say about Multnomah oiled Plyform panels."

Your Union Oil representative can help you with your problems, too! He knows the petroleum products that will save your firm money by doing the job better. Call him today.

UNION OIL 76 COMPANY OF CALIFORNIA

LOS ANGELES: Union Oil Bldg. • NEW YORK: 45 Rockefeller Plaza • CHICAGO: 1612 Bankers Bldg.
ATLANTA: 401-02 Atlanta National Bldg. • NEW ORLEANS: 644 National Bank of Commerce Bldg.



MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

Saw their dry kilns

Editor, WESTERN INDUSTRY:

We have noted with interest the article on pages 47, 48 and 50 of your October issue featuring the modern kiln drying facilities at several Western Pine plants, including Weyerhaeuser Timber Co. at Klamath Falls, Oregon, and the former Red River Lumber Co., Westwood, California. This latter plant is now the Fruit Growers Supply Company.

The pictures used in your article are of our Moore Cross-Circulation Kilns, and if you have additional copies of this story, we would like to get 6 to 8 copies for other members of our organization.

This is an interesting story and we are wondering if you can advise us the name of the author.

LLOYD G. EVANS
Moore Dry Kiln Co., North Portland, Ore.

Editor, WESTERN INDUSTRY:

We have seen copy of letter which our North Portland, Ore., office wrote you . . .

We are interested in seeing a copy of your October issue, and will appreciate your mailing a copy to us at P. O. Box 4248, Jacksonville 1, Fla.

JOHN B. TURNER, JR.
Moore Dry Kiln Co., Jacksonville, Fla.

Never-ending demand

Editor, WESTERN INDUSTRY:

Please send us reprints of Glen Ghormley's articles on "The Learning Curve."

CHARLES R. ALANCRAIG
Oleum Process Department, Union Oil Co. of Calif., Rodeo, Calif.

Editor, WESTERN INDUSTRY:

I'd appreciate it if you can send me a set of tearsheets on the Ghormley articles, "The Learning Curve," published, I believe in four parts, early in '53. Thanks much.

I. W. DEAN
North Hollywood, Calif.

New Materials-Handling Technique Features Tractor Shovel with Quick-Change Front End

Equipment flexibility is an important answer to high production costs. This accounts for the popularity of the thousands of Allis-Chalmers HD-5G Tractor Shovels now in use in plants of all kinds. The 40-hp. crawler, with its wide range of front-end attachments, digs, carries, dumps, stockpiles, spreads or loads materials of all kinds. Its power and versatility enable it to replace a fleet of part-time specialists . . . to pay its way *full time* both in and around the plant.

DIGS TRENCHES With Trench Hoe attachment, the HD-5G digs a flat-bottom ditch 27 in. wide and to a depth of 8 ft. Ideal for laying pipe, digging foundation footings, other vertical excavations.

SKIDS, LOADS, STACKS SOLIDS Lift Fork attachment handles steel beams, pipe, lumber, packaged or palletized loads up to 4,000 lb. Works easily in unpaved yards where rubber-tired equipment bogs down.

OTHER attachments include Narrow Bucket, Rock Bucket, Rock Fork, Tine Fork, Crane Hook and Drag Bucket. Attachments may be interchanged in about 20 minutes by simply removing and replacing four pins. Ask your Allis-Chalmers dealer to show you how the versatile HD-5G can increase efficiency in and around your plant.

HANDLES SAND, CLAY — ANY BULK With standard 1-yd. bucket, the HD-5G loads trucks, feeds hoppers and conveyors, builds stockpiles. Crawler tracks stand up in cullet and other abrasive material as only steel can.

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CALENDAR OF MEETINGS

JAN. 28-30—*Colorado Mining Assn.*, annual meeting, Shirley Savoy Hotel, Denver. Contact Robert S. Palmer, executive vice president, 204 State Office Bldg., Denver.

JAN. 29-30—*Industrial Engineering Institute*, University of California, Berkeley campus. Contact Bruce G. McCauley, general chairman, Assistant Professor of Mechanical Engineering, U. of C., Berkeley 4, Calif.

FEB. 1-2—Same institute as above, at UCLA campus, Los Angeles.

JAN. 31-FEB. 3—*California & Nevada Mfrs. of Carbonated Beverages*, regional meeting, San Francisco. Contact G. Culley, executive secty., 20 S. First St., Alhambra, Calif.

FEB. 1-5—*National Assn. of Corrosion Engineers*, annual short course in corrosion, Washington State College, Pullman, Wash. Contact Dr. M. F. Adams, associate chemist, Division of Industrial Research, WSC.

FEB. 2-5—*American Society of Sugar Beet Technologists*, eighth general meeting, Shirley Savoy Hotel, Denver. Contact Box 531, Fort Collins, Colo.

FEB. 7-9—*Washington Bottlers Assn.*, state convention, Tacoma, Wash. Contact E. Smith, Seattle, MA 7496.

FEB. 11-12—*California Industrial Safety Conference*, Palace Hotel, San Francisco. Contact M. Flagg, Educational section, State of California Dept. of Industrial Relations, 965 Mission St., San Francisco 3.

FEB. 11-13—*Oil Filtration in Modern Industry*, symposium sponsored by Dept. of Engineering, UCLA, in cooperation with American Society of Lubrication Engineers, Los Angeles section. Contact Dept. of Conferences and Special Activities, University Extension, UCLA, Los Angeles 24.

FEB. 15-17—*National Welding Supply Association*, national convention, San Francisco. Contact Robert C. Fernley, secretary-treasurer, 1900 Arch St., Philadelphia 3, Pa.

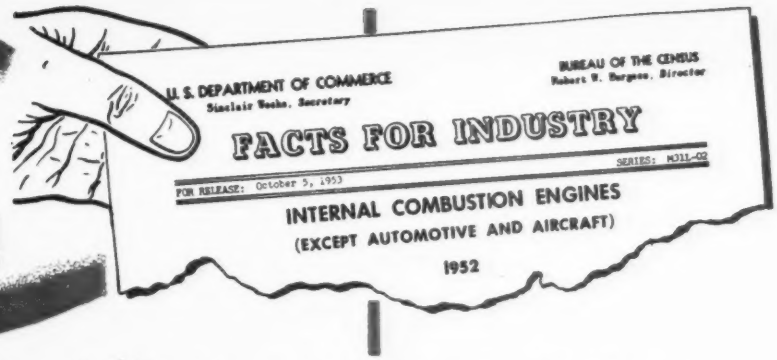
FEB. 17—*Bay Area Management Conference*, regional meeting, Hotel Claremont, Berkeley, Calif. Contact H. Waldorf, Oakland Chamber of Commerce, GL. 1-7800.

FEB. 17-19—*Western States Meat Packers Assn.*, regional meeting, San Francisco. Contact E. F. Forbes, president and general manager, 604 Mission St., S. F.

FEB. 19-20—*National Society of Professional Engineers*, Spring meeting, Hilton Hotel, Albuquerque, New Mexico. Contact K. E. Trombley, NSPE, 1121 Fifteenth St., Northwest, Washington 5, D. C.

FEB. 23-28—*American Concrete Pipe Association*, national convention, San Francisco. Contact Howard Peckworth, managing director, 228 N. LaSalle St., Chicago 1, Ill.

Proof of Sustained Leadership!



More than 50% of *Carburetor Type Engines from 3 to 40 H.P., Produced and Sold in 1952 for Re-Sale or Original Equipment Power *were*

WISCONSIN ENGINES

*Does not include automotive, aircraft, outboard marine or "captive" engines made by manufacturers for use on their own equipment.

Again official U. S. Government statistics provide positive proof of Wisconsin Air-Cooled Engine leadership, based on figures contained in Bureau of The Census release, dated Oct. 5, 1953.

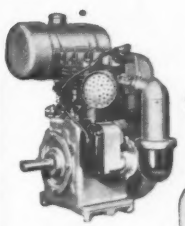
These statistics, compiled from reports received by the Census Bureau from 94 manufacturers of Internal Combustion Engines, indicate that Wisconsin Motor Corporation produced more engines within our horsepower range, *than all other engine manufacturers combined.* This includes all Census Bureau classifications from 11 to 175 cu. inch piston displacement, although the smallest Wisconsin Air-Cooled Engine has a displacement of 13.5 cu. inches, and the largest 154 cu. inches.

The breakdown, based on Census Bureau groupings is as follows:

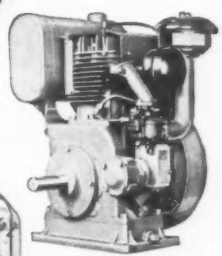
11 to 50 cu. in. displ., Wisconsin's share	**54.22%**
51 to 100 cu. in. displ., Wisconsin's share	**72.51%**
101 to 175 cu. in. displ., Wisconsin's share	**29.44%**

The aggregate average of Wisconsin Heavy-Duty Air-Cooled Engines, within the above power classifications, amounts to more than 50% of the total . . . in excess of the combined output of the other 93 engine manufacturers covered by the survey.

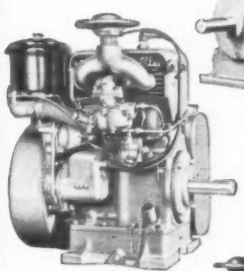
This Proof of Preference should be of special interest to all original equipment purchasers, users, distributors and dealers because it is indicative of outstanding Customer Satisfaction . . . based on Wisconsin Engine Structural and Operating Power Advantages. It pays to back a winner!



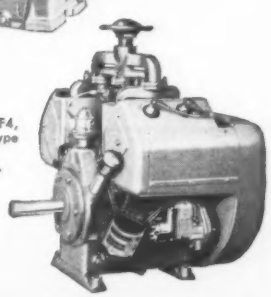
Models ABN, AKN, AEN, 4-cycle single cylinder, 3 to 8¼ hp.



Models AFH, AGH, AHH, single cylinder, 6 to 9 hp.



Models TE and TF, 2-cylinder, 7 to 15 hp.



Models VE4, VF4, and VG4D, V-type 4-cylinder, 15 to 36 hp.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

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Wyandotte Chemicals Research Bldg. Architect: Stanton & Hillier. Consulting Engineer: George Wagschal Assoc. Contractor: Walbridge-Aldinger Co.

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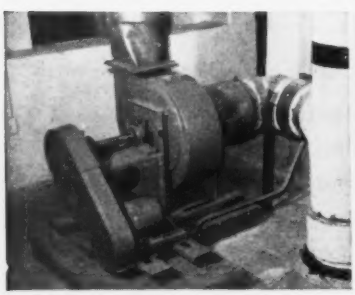
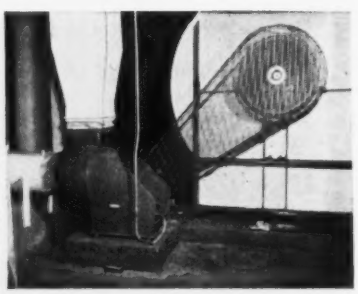
Wyandotte Chemicals Corp. chooses American Blower equipment for new multi-million dollar research building

Air — the right kind of air, properly cleaned, conditioned and humidified — is a vital necessity in a modern chemical research laboratory. That's why Wyandotte Chemicals Corp. chose American Blower equipment for their highly functional new research building which has complete air conditioning in every laboratory. American Blower engineers have a complete knowledge of the air cycle and the special problems of many industries. Whenever you have an air handling problem give your nearest American Blower or Canadian Sirocco Branch Office a call.



Individual laboratory exhaust fans (rubber covered and corrosion resistant) have two speeds: slow for normal exhaust; high for experimental work. This allows the chemist to completely control room and hood ventilation.



Secondary air is supplied by an American Blower HS fan with humidifier and dehumidifier, heating and cooling coils. Fan in foreground is American Blower utility set used to ventilate hard-to-reach areas such as stairways, etc.

American Blower Series 81 Sirocco Fan. All Sirocco Fan ratings are certified in accordance with the Standard Test Code.

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THE CASE OF THE MISSING FIRM*

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to insure that yours will not be "The Missing Firm"

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MORE THAN A BILLION DOLLARS will be spent in the West during 1954 for new plants and equipment alone.

What does this mean for you?

If your firm is typical of those doing business in the West, its Western sales have grown at a phenomenal rate, pressured by the demands of a market that grows and changes every day. And you are ready in most ways to get your 1954 share.

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There are many men important to your firm's future who know little, if anything, about you—who you are, what you make, the contributions you are making to Western industrial progress.

You may be missing an unequaled opportunity to explain your key position among Western manufacturers and suppliers. This type of message should reach the right men, at the right time, and in an impressive and beneficial atmosphere.

In your hands now is this opportunity — *Western Industry's* Review & Forecast Number, a unique guidebook that each year paints on one canvas all of the forces, trends and developments that are shaping the destiny of the industrial West.

It reaches the right men (more than 10,000 buyers and influencers) at the right time (when they are charting their courses for the coming year).

Study this current edition, and see how effective your message would be in its pages. Then, if you are not already represented, mail us the accompanying postcard. It simply tells us to remind you in plenty of time so that you can think about preparing your message for the 1955 Review & Forecast Number.

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Western Industry

JANUARY 1954

6TH ANNUAL REVIEW AND FORECAST

Industrial developments and trends in the West reported, analyzed, evaluated

By A. C. PRENDERGAST
Editor, WESTERN INDUSTRY

THE PURPOSE of WESTERN INDUSTRY's annual Review and Forecast is to give our readers a thorough and reliable picture, both general and specific, of the industrial West which they can put to practical use.

This introductory article appraises and discusses what appear to the editors of WESTERN INDUSTRY to be some of the controlling factors in the West's economy. Following this article will be found a series of articles, features and reviews covering the situation in greater detail.

AFTER three stages of industrial growth since 1940 popularly considered unusual or extraordinary, the West now seems to be entering a fourth that may be forecast as "normal"—if that word has a meaning any more.

In other words, it will be geared to the West's remarkable population growth (see accompanying chart), plus whatever new utilization of natural and human resources and scientific discoveries may develop.

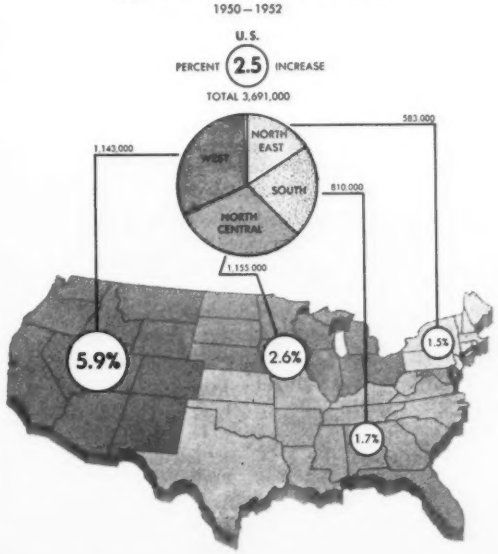
Current peak is past

It promises to be characterized at the outset by a moderate slowing down from the record expansion of the Korean war period now ending, but still following a good upward long-term curve.

Because the West is in a "growth economy" it should be proof against any severe declines such as have beset other sections. This is substantiated by the 1947-1950 period, when the West gained in manufacturing employment.

The first of the three stages of industrial growth previously referred to was the war period, marked by the sudden arrival of heavy industry in various forms. Second was the postwar era when the permanency of the West's growth began to be recognized and the rush to establish additional manufacturing facilities for the West started. Third was the Korean emergency, accompanied by two influential factors: (a) publication of the 1950 census, which removed all doubts about the West's population increase; (b) the government's authorization of quick amortization, which made it profitable to construct new facilities immediately.

INCREASE IN CIVILIAN POPULATION
1950–1952



Tremendous impact

Because the West's growth is mainly immigration—California alone is estimated to be adding 22,000 people a month from the outside—the impact on the economy is far greater than that of the natural increase in the longer settled regions.

Adding to the West's population in two years another state as populous as Colorado, or both Maine and Vermont, is what the U. S. Census Bureau's latest estimates for population increase between 1950 and 1952 signify. California added almost the equivalent of the whole state of Rhode Island, while Washington and Oregon together gained the equivalent of the state of Nevada.

The Pacific Coast's gain of

833,000 civilians in two years was almost as much as the gain of the entire Atlantic Seaboard from Maine through Virginia. The sparsely settled Mountain States' gain of 309,000 was more than Michigan's population increase in the same period, and almost as much as Ohio's.

The crying demand for homes, schools, streets, highways and the like bears eloquent testimony to the impact of the new population on the West, and these needs in turn are reflected by manufacturing activity required to keep up the demand.

A good example of the impact is to be found in the following figures of regional housing activity, showing that the West accounts for 20 to 25% of the total nonfarm residential building in the country.

	Built in the West	Percent of national total
1948	213,100	22.87
1949	195,700	19.09
1950	287,200	20.57
1951	217,300	19.91
1952	346,500	30.74
1953 (6 months)	133,200	22.91

Figures for 10 months of 1953 show a total of 200,965, indicating a big drop from the banner year of 1952, but well up alongside previous years.

California ranks Number 1 for population increase—685,000 civilians in two years—almost twice as much as the next state, Texas. This census estimate gives California a civilian population of 11,098,000 as of 1952, second in the nation and 587,000 ahead of third-place Pennsylvania.

Surprisingly, the second Western state in population gain is Arizona, with 108,000 civilian increase. Washington is third with 80,000, Colorado fourth with 79,000 and Oregon fifth with 68,000.

While Arizona has benefited by considerable defense plant activity, nevertheless its astonishing spurt seems to be due primarily to the same magnet that began drawing people to Southern California soon after the turn of the century, namely, climate.

Furthermore, Arizona seems to be in the infant industry condition for which Los Angeles was ridiculed for so many years. It also has up-and-coming business leaders who may do in a degree for Arizona what leadership so notably did for Los Angeles.

A large part of the West has limited water supply to face in varying degrees, with Arizona probably the most acute.

But natural conditions are not necessarily unchangeable. A geochemist named Stephan Riess, of Simi, California, who has been notably successful in drilling wells, contends that deep in the earth a plentiful supply of new water is being manufactured by nature, entirely apart from the precipitation filtering down from the earth's surface that is conventionally considered water supply.

The water from the wells on his ranch flows hot by night after a day of pumping, indicating that it rises from great depths. He and associates are now drilling a well near Fallbrook, Calif., historic for water scarcity because of the much publicized lawsuit to prevent the U. S. Government from gobbling up its scanty supply to serve military installations.

Riess' discovery conceivably could change the face of the whole West. While this may seem like a flight of fancy, it warrants consideration, when such startling things as the piercing of the sonic barrier and the release of atomic energy are already old stories.

General Electric's proposal that it be authorized to construct an electric generating plant supplied from the plutonium plant at Hanford, Washington, apparently got no very warm reception from the AEC. Some well-informed observers feel, however, that the safety factor of the wide open desert spaces of the West, along with abandoned mine shafts in which to bury atomic wastes, make the West a "natural" for atomic applications.

The Pacific Northwest's pet barrier of chronic power shortage also shows signs of being pierced, now that private and public utilities in the region are moving ahead in the direction of building dams themselves to work out their own supply situation, instead of being tied to the federal apron strings of Congressional appropriations.

The present 5,000,000 kilowatts of developed hydro power in the region could be increased to 13,000,000 kw. in the present decade, if the means could be found to do the job, according to Miner H. Baker, assistant vice president and economist of the Seattle-First National Bank. Local enterprise may already be on its way to finding the means.

The importance to the West of three leading groups of industries, transportation (which spells aircraft largely), lumber and its products, and food, seems to be plainly indicated by the following figures from the 1952 Survey of Manufactures:

(dollar figures in millions)

	Number of employees	Wages	Value added by manufacture
Transportation	276,018	$1,247.2	$1,733.2
Food	224,662	810.5	1,745.8
Lumber and products (exc. furniture)	221,859	896.5	1,562.7
Total, three groups	722,539	$2,954.2	$5,041.7
Total, all industries	1,456,375	$5,992.8	$10,707.1

RELATIVE PERCENTAGE INCREASE IN MANUFACTURING OUTPUT

Based On Value Added By Manufacturing

Faster rate of growth in the West

Value added by manufacture
(dollar figures in thousands)

	United States	West
1952	$108,477,364	$10,707,192
1951	102,085,814	9,681,007
1947	74,425,825	6,383,236

Increase over 1947

	United States		West	
1951	$27,659,989	37.16%	$3,297,771	51.66%
1952	34,051,539	45.75%	4,323,956	67.74%

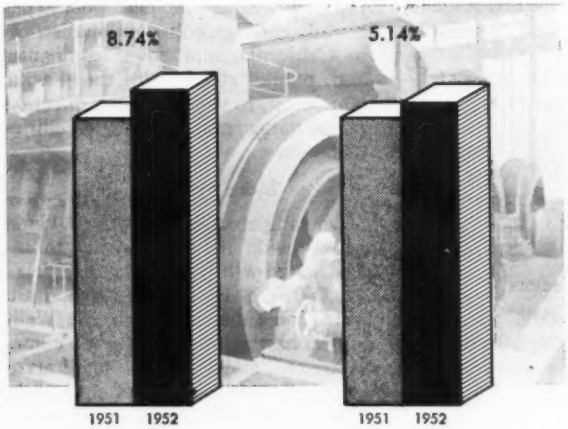
EXPENDITURES FOR PLANT AND EQUIPMENT

1951 100%

Expenditures For New Machinery And Equipment.

In The U.S. Increased 8.74%

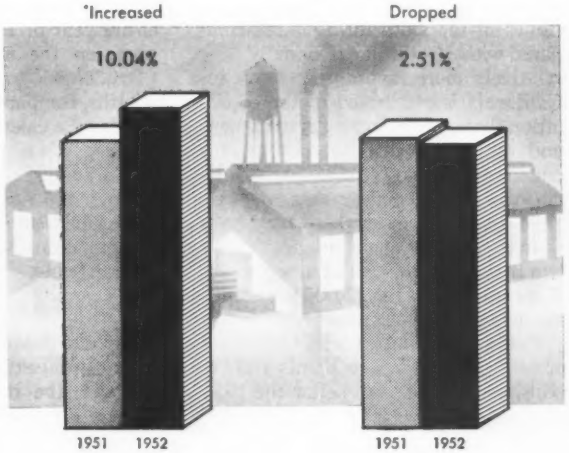
In The West Increased 5.14%



Total Expenditures For Plant And Equipment.

In The U.S. *Increased 10.04%

In The West Dropped 2.51%



(In thousands of dollars—from Census Bureau Survey of Manufactures)

	Total expenditures		New structures and additions to plant		New machinery and equipment	
	1952	1951	1952	1951	1952	1951
Montana	*	†	*	†	*	†
Idaho	*	$ 16,731	*	$ 3,385	*	$ 13,346
Wyoming	$ 15,142	12,328	$ 1,978	3,530	$ 13,164	8,798
Colorado	34,183	31,481	8,469	11,859	25,714	19,622
New Mexico	4,773	5,060	*	†	*	†
Arizona	11,193	9,483	*	†	*	†
Utah	17,076	25,057	4,702	11,724	12,374	13,333
Nevada	1,445	1,774	*	†	*	†
Washington	144,892	100,826	43,004	26,871	101,888	73,955
Oregon	80,154	111,550	17,764	30,053	62,390	81,497
California	457,910	493,756	164,069	193,738	293,841	300,018
Total West	$809,605	$829,909	$254,393	$301,840	$555,212	$528,069

*Figures not yet available. †Estimate did not meet publication standards.

WEST STILL UNDEREQUIPPED—BIG FUTURE MARKET

Preceding figures indicate that the West is still too youthful industrially to have a well-balanced economy, but more diversification is appearing all the time as the population base broadens and additional types of activity become economically justifiable.

Within these three main groups diversification is also appearing. The airframe companies are becoming involved in electronics and metal fabricating to an extent that will stand them in good stead if they are forced to turn their attention to other lines of endeavor.

Again, the lumber industry is no longer merely a raw material producer, but is steadily becoming a manufacturer of semi-finished or finished products or components which are assembled on the building site to form a completed home.

The fruit and vegetable canneries and frozen food packers, the dominant element in the Western food industries, are becoming engineering-conscious to an extent that enables them to offset raw material and market fluctuations with production economies.

At the same time, entirely new elements are being introduced into the Western economy, such as electronics and instruments, to say nothing of the practical peaceful applications that may come out of the now-classified rocket and missile programs.

All in all, there are so many healthy signs that it is difficult to have any pessimism about the West's future.

Unfavorable elements

On the unfavorable side may be listed such things as the tapering off of military programs, not likely to be serious in 1954, but which in the past led to acute repercussions in San Diego and Seattle, for example.

The slowing down of home building programs, to which so much of the Western industrial machine is geared, would be widely felt. The last half of 1953 saw some sharp contraction from the 1952 peak.

Difficult times for farmers will be felt by many in the West, including the chemical people, to whom agriculture is the No. 1 Western market. The prospective big cut-back in cotton acreage in California and Arizona is a sharp example.

Flooding of the domestic market by foreign petroleum is already slowing down the pumping of oil and the search for new fields in California and the Intermountain region. Very little additional refinery expansion is scheduled for the West, in comparison with the rest of the country.

The accompanying chart and table reveal that the West is falling behind on plant construction and the purchase of new equipment.

A survey by the California State Chamber of Commerce indicates a drop of about 2% in individual incomes in the state for 1954, as compared with 3% decline nationally. The relatively more favorable outlook for California is attributed to the expectation that manufacturing employment and output and capital outlays for construction will remain above the national levels, as they were in 1953.

At the same time, there may be a sharper relative unemployment problem if the immigration of new population continues at the 22,000 per month average of the last three years.

Preliminary estimates for California of $490,000,000 in new plants and expansions for 1953 fall below the 1952 all-time peak of $626,781,570 and the second-place record of $539,364,365 in 1951, but are about twice that of preceding postwar years. Northern California actually showed an increase over 1952, $262,475,000 for 11 months, or $57,500,000 ahead of the entire year of 1952. The Los Angeles area, on the other hand, had only $183,266,000 to report for the first 11 months, compared with the $308,400,000 for the calendar year of 1952.

More than $15,000,000 in new plants and expansions for the Portland area in 1953 was reported by the Portland Chamber of Commerce. Other regional or area figures in the West are not available.

Favorable factors

On the favorable side, there are plenty of offsetting factors. In oil, for example, the rise of a new refining center on Puget Sound for Canadian oil opens the way for related chemical operations.

The government's reversal of policy regarding water and power unmistakably points to an era of fewer multi-purpose federal dams. But at the same time, the new policy has already encouraged irrigation districts in California, and power companies and public utilities in the Pacific Northwest, to venture in the direction of planning and building facilities themselves.

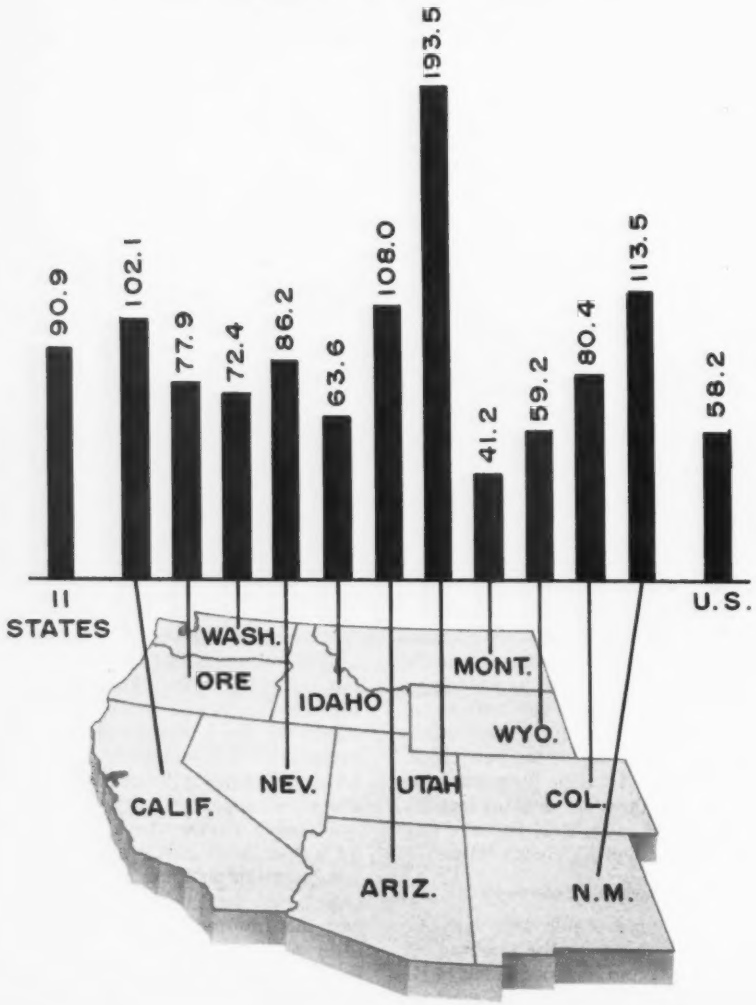
More self-sufficient

Opening up of new agricultural land will provide its contribution to industrial growth. In the next five years 150,000 acres in the Columbia Basin will come under the ditch, the Wellton-Mohawk project back of Yuma, in Arizona, may bring in 100,000 acres eventually, and the Eden project in Wyoming 25,000. These will be swelled by numerous small additions to present irrigated areas all through the West.

The West's growing ability to serve the needs of its people is significantly pointed out by General Robert E. Wood, chairman of Sears, Roebuck & Co. In 1952 the company bought $143,000,000 worth of goods from Pacific Coast manufacturers, nearly 14 times greater than the 1938 total of $10,672,000. Goods manufactured by Pacific Coast industries accounted for 35% to 40% of all Sears retail sales in the Western area, compared with only 6% to 7% in 1938. The firm also exported $19,000,000 of locally manufactured articles to other territories.

In the final analysis, the urge to live and work in the West is an influence of dominating power, one of the basic forces propelling the West forward discussed in the next succeeding article in this issue.

PERCENT INCREASE IN NON-AGRICULTURAL EMPLOYMENT IN THE WEST



Every Western state except one is above the national average

Non-Agricultural Employment
(figures in thousands)

State	1939	1952	% Increase
Montana	108.4	154.1	41.2
Idaho	83.9	137.3	63.6
Wyoming	53.9	85.8	59.2
Colorado	228.7	412.5	80.4
New Mexico	78.7	168.0	113.5
Arizona	94.2	195.9	108.0
Utah	110.3	213.4	193.5
Nevada	34.7	64.6	86.2
Washington	424.1	731.3	72.4
Oregon	257.3	457.7	77.9
California	1,812.0	3,662.2	102.1
Eleven State Total	3,296.2	5,093.8	90.9
United States	30,310.9	47,939.5	58.2

Source: Bureau of Labor Statistics.

BASIC FORCES . . .

. . . why they propel the West forward

By

ROBERT R. DOCKSON

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Los Angeles

THIS ARTICLE is an attempt to demonstrate to the readers of WESTERN INDUSTRY the importance of a broad perspective for the individual enterpriser.

We should examine our Western economy to see if we can isolate at least some of the dynamic forces responsible for the developments that have come since the end of World War II.

Are there some changes occurring that will have an influence upon our future markets? Are these changes discernible and are they worth consideration by the industrial, commercial, and financial firms of the West?

Before thinking specifically about the West as a region we must identify it. WESTERN INDUSTRY defines the West as consisting of the eleven Western States. In my own opinion, this selection can be defended as well as any other grouping. There are subregions within the eleven state area, i.e., the Inland Empire, Rocky Mountain, Puget Sound, etc.; but not one of these could rightfully claim to be the West." (See map on page 43.)

The twain meet

In a cursory survey of such studies I found 22 organizations agreeing that, as long as state boundaries are employed, the West begins at approximately the eastern boundaries of Montana, Wyoming, Colorado and New Mexico. The eleven Western States are included in the area west of these boundaries and spread over 1,184,000 square miles, approximately 40% of the land area of the continental United States.

The West, as a region, is faced with the same types of commercial and economic problems that face a foreign country. That is, the area is endowed with certain resources that serve as a basis of business activity. What is accomplished with these is dependent upon the interests, abilities and needs of the population residing in the area and on the flow of funds, goods and services across its borders.

Population importance

The most important resource a region possesses is its population. The market for all types of consumer goods is determined by this factor. It is not the number of persons alone, however, but also their distribution by age, geographical position, race and environmental influences, that should be considered by firms analyzing the Western market. Educational levels, birth and mortality rates, political beliefs, religious affiliations and climatic conditions all have an effect upon the quality, quantity and variety of goods and services marketed in a region.

In the West the story of population growth since 1940 is one that might well stimulate any business organization to plan for an expanding market for its products. In 1940 the eleven Western States had a population of 13,800,000, or 10.5% of the total population of the nation. Since that time, the population of the Western area has expanded approximately 53%.

Today it is estimated that there are nearly 22,000,000 people, or more than 13% of the nation's total population, located in the West. Out of the 48 states there are only six with a larger population than the increase experienced in the Western region since 1940.

Approximately 73% of the West's total population is located in the three coastal states. This concentration leaves fewer than 6,000,000 people spread throughout the other eight.

Good markets afield

Many businesses feel the population densities of these states do not warrant promotional efforts. However, a little investigation by the market research personnel of a business often points to islands of population concentration that turn out to be profitable markets.

For example, a close look at what might be referred to as the Salt Lake City trading area reveals an island of population of approximately 300,000 people. Some of the other population

THE AUTHOR was graduated from the University of Illinois in 1939 and received his master's degree from the University of Southern California in 1940. In January 1942, he joined the Navy, returning after four years to become a lecturer in economics at USC, where he received his Ph.D. in economics in 1946.

Going to Rutgers University as an instructor, he became Director of the Bureau of Economic and Business Research in 1947, leaving in 1948 to become economist and director of research for the Prudential Insurance Company in its Western Home Office at Los Angeles.

In February 1952 he joined the Bank of America to establish an economic department in the bank's head office at San Francisco, leaving in September 1953 to become head of the Department of Marketing at USC.

Two angles of vision

A PROFESSOR examines an economy from a different vantage point than that of the average businessman. He is interested in principles, trends, basic forces affecting one another, and any number of factors that explain *why* an economy follows a particular behavior pattern.

The businessman, on the other hand, has been interested primarily in the specific forces that influence the behavior of his individual firm. In recent years many enterprises have appreciated the benefits of a broader perspective and have linked hands with academicians in order to understand more clearly why an economy behaves as it does.

Both professors and businessmen have gained from these endeavors, to a degree that both are making more significant contributions towards cementing the foundations of our economic structure.

islands in the eight inter-mountain states that might warrant further investigation are: Maricopa County in Arizona, approaching a population of 400,000; the Denver metropolitan area, over 625,000; the Albuquerque area, in the neighborhood of 200,000; the Boise, Idaho, concentration, approaching the 100,000 mark.

When attention is turned to the coastal states, California, of course, possesses the bulk of the population. With approximately 12,000,000 people in California, this state contains nearly three-fourths of the coast's population.

Numbers swell

During the post-war years, about 70% of California's increase in population has been coming from in-migration. The percentage holds true for the other ten states in spite of the fact that the Western states seem to maintain higher birth rates than those in the rest of the United States. If the present rate of population increase continues, California will have approximately 15,000,000 people by the middle of 1960.

Western business should be planning now to see that the needs of these people will be met by Western enterprises. If proper consideration is given to this factor, every firm operating here in the West cannot help but have at least one very strong element of optimism included in its developmental plans.

The growing population is beneficial to those who have a service or product to market. It results in an expanding economy, and affords the opportunity to find employment and to maintain or raise family living standards.

The aggregate population of the eleven Western States will be in the neighborhood of 25,000,000 to 26,000,000 people by the middle of 1960. This expanding population will have to depend on industrial expansion for the jobs people will need. The question that deserves attention is whether or not the industries of the West are likely to furnish a sufficient number of jobs to enable our living standards to continue to rise.

There are many complications to a problem of this nature, but it is of interest to note what has been occurring and then to estimate what might be expected in the years immediately ahead. Since World War II, non-agricultural employment in the eleven Western States has increased from approximately 4,700,000 to 5,800,000, an increase of nearly 23%. This rate of growth has exceeded the rate of increase for non-agricultural employment for the nation as a whole, but even nationally the increase has been about 21%.

Jobs on the increase

Thus, during the post-war period, non-agricultural jobs in the West have increased at a rate slightly faster than they have for the entire country. In the West, it has been the manufacturing group of industries which has experienced the most rapid growth, while construction and government have been close behind.

For the nation as a whole the same three categories have led in the expansion of non-agricultural employment. In the case of the nation, however, the construction industry experienced the most rapid growth, while government and manufacturing were second and third respectively.

When the trends are analyzed, it becomes evident that the states located within the Western area have experienced varying degrees of expansion in non-agricultural employment. (See accompanying chart.) In the aggregate, however, it appears that our Western economy is becoming more and more like the industrial structure of the rest of the United States. If this trend continues, the West as a whole can expect to increase its manufacturing employment at a faster rate than can the entire country. In addition, manufacturing employment should continue to grow at a rate greater than the increase in all the other categories, including the trades, services, construction and transportation.

Each of the Western States possesses its own pattern of industry distinct from that of the others. Because California has approximately 65% of the total non-agricultural employment and over 70% of the manufacturing wage and salary workers in this area, a look at the structure of that state enables us to discuss trends affecting the entire area.

Non-agricultural employment in California has increased 103% since 1940, while population has gone up but a little more than 70% within the same period. Here, the same growth tendencies noted for the eleven Western States as a whole dominate. Manufacturing, construction and government, in that order, have grown at rates of increases in the neighborhood of 150% since 1940.

The other major categories—transportation, the trades, services and finance, have grown at lesser rates but still in excess of the rates experienced by the nation as a whole.

Although the manufacturing classification has expanded its share of total California non-agricultural employment from approximately 21% to 27%, it still is considerably below the 35% share it holds of the total of such employment in the United States. As the population of California continues to grow, the industry structure of this state will look more and more like that of the nation as a whole.

A partial explanation for this tendency is that as the size of markets increases, they become more self-supporting and less dependent on outside sources for their manufactured products. Local markets, if large enough, offer opportunity to capitalize upon the techniques of mass production and thus local producers can compete in price with national concerns.

In California, the aircraft and parts industry is responsible for much of the expansion in manufacturing employment. This classification furnishes jobs for about 20% of the total manufacturing wage and salary workers in California and has increased about 147% since 1950.

There are many who feel that the development of the aircraft and parts industry in California has caused an unbalance that is dangerous to the economy. They fear that a cutback in aircraft defense expenditures will bring large scale unemployment and a reduction in living standards.

This fear is based upon the assumption that other industries cannot absorb those who might find themselves

The economic regions of the West

These regions were developed by the Research Department of the Western Home Office of the Prudential Insurance Company when the author served as its economist.

Home building is the market for much of the West's industry

Nonfarm dwelling units built 1948 through six months of 1953

California	886,200	Idaho	18,900
Washington	114,200	Montana	14,300
Colorado	69,400	Nevada	12,400
Oregon	64,100	Wyoming	9,600
New Mexico	41,100		
Arizona	34,200	Total, 11 Western States	1,293,000
Utah	28,600	Total, United States	6,152,400

Civilian population

	1952	1950	Increase	% Increase
United States	153,324,000	149,634,000	3,691,000	2.5
Northeast	39,927,000	30,344,000	583,000	1.5
North Central	45,523,000	44,369,000	1,155,000	2.6
South	47,462,000	46,653,000	810,000	1.7
West	20,411,000	19,269,000	1,143,000	5.9

without jobs. In the author's opinion, this assumption is incorrect and should be discarded for several reasons.

The likelihood of a substantial decrease in expenditures for air defense seems very remote at the beginning of 1954. Air transportation has become an important part of our peacetime living, and it is doubtful that the employment in this industry will slip back to its pre-Korean level. The workers in this industry are skilled, and represent an important source of manpower when and if the next great phase of transportation development comes into its own.

Other industries in California are growing at a rapid rate and they will not necessarily drop, even if there is a setback in the aircraft and parts industry. The electrical machines and equipment industry and motor vehicle industry have been expanding since 1950 at a faster rate than the aircraft and parts industry.

Among the manufacturing industries which have been growing at impressive rates of increase are: shipbuilding and repair, machines, primary metal, fabricated metal, rubber products, paper and textiles. Many of these are expanding because of the increasing demand for goods from a population that is growing approximately three times as fast as the national average.

Public works projects

The potential demand for durable goods to be used in public works projects, such as the building of freeways, schools, municipal buildings, hospitals, transportation lines, and sewers, remains great in California and also in the other Western states. This demand serves as an important base for the further expansion of other industries than aircraft and parts.

The trends of California are, of course, not identical to those of each of the other ten states. However, if manufacturing employment in California grows and if it becomes a relatively more important source for jobs in California, it is likely that the same trend can be anticipated for the West as a whole.

Much more could be written about non-agricultural employment in the West, but certain factors have been highlighted to present an additional note of optimism for those who are considering future employment possibilities.

Needless to say, this optimism should be held with a full understanding that cyclical fluctuations are not as yet eliminated. It is merely a manifestation of the fact that the growth curves of certain manufacturing industries in the West are still ascending at quite rapid rates.

Another dynamic segment of the Western economy is agriculture. Approximately 9% of the total income payments of the West is derived from this source. When this is compared with about 7½% derived from the same source in the remainder of the United States, it becomes obvious that agriculture plays a disproportionate role in the Western total income picture.

Land usage

The use of Western lands follows a different pattern from that of the 37 Eastern states. Only 43% of the more than 1,000,000 square miles of the West is devoted to farming, while there is nearly 73% devoted to such use in the East. Of the West's farmland, about 20% is devoted to cropland, whereas nearly 50% is devoted to this use in the East. In the case of pasture land, 77% of the farming area is devoted to this purpose in the Western States, while but 43% in the East. This difference in land use between the West and East highlights the fact that we are raising different things on our farms.

Agricultural employment in the Western States has continued to grow while it has declined in the East. In both areas, agriculture has become a relatively less important source of jobs, but in the West the enterpriser has an expanding market among agricultural workers, whereas his market is declining in the East.

During the post-war years the construction industry has played a dynamic and expansive role in the Western economy. It has already been pointed out that this industry has been one of the leaders as far as job offerings are concerned. The West's increasing population will continue to require adequate housing as well as additional store and service establishments. This means that as long as population continues to grow here in the West at a faster rate than it does elsewhere in the United States, we can expect the construction industry to be in a stronger position in this area than in the East.

Since the close of World War II over 8,000,000 dwelling units have been added to the housing inventory of the United States. Approximately 22% of these have been constructed in the Western area. This increase in living facilities has stimulated a great number of industries producing not only non-durable goods but also durable consumer goods of a large variety. In addition to the hundreds of items that go into a household when it is first constructed, there will be an increasing demand for repair and maintenance supplies and equipment.

Commercial and industrial construction in the West has more than held its own in comparison with the same type of construction elsewhere. Defense contracts let in the West since 1950 have approximated 18% of the total let throughout the naton.

This figure is significant when compared with what might be considered peacetime Western manufacturing activities. In 1947, for instance, manufacturing for the eleven Western States, as measured by "value added," amounted to 8% of the total manufacturing activity of the country. Nearly all of the defense contracts resulted in new construction that strengthened the physical plant position of the West.

Another dynamic factor affecting Western industry is the rapid growth and development of the steel industry. As this industry grows, secondary steel-using operations can be expected to spring up, giving the West greater diversification and thus a firmer industrial base.

There are many other basic forces at work in the West that have an effect upon our industrial development. Both foreign trade and inter-regional trade should not be overlooked as significant segments of our business picture. New technological advances in such industries as the petroleum-chemical, electronic equipment, biochemical, atomic energy equipment and mining will also bring increased business activity as well as new job opportunities.

In review, it would seem that the Western businessman has much to gain by keeping a broad perspective in regard to the future of Western industries. Specific businesses will experience their ups and downs but a close look at the basic forces working in the economy give us many reasons why we can remain optimistic.

CONTRIBUTIONS OF WESTERN ENGINEERS

to the development of the industrial West

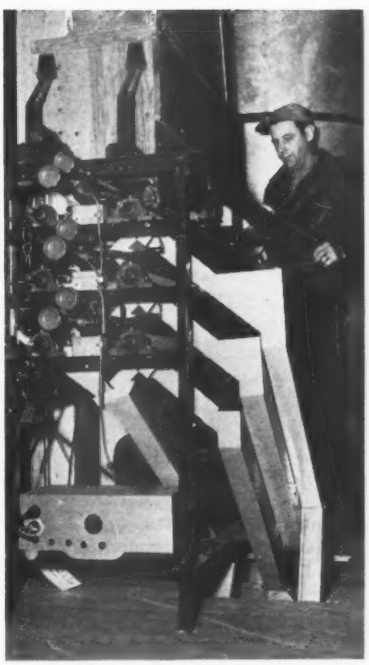
EVEN MORE important to the West than its natural resources are its mental resources. Examples of the creative ability of its engineers are here illustrated.

This special feature was prepared with the cooperation of the American Society of Mechanical Engineers sections in San Francisco, Los Angeles, San Diego, Portland, Seattle, Spokane, Richland, Salt Lake City, Denver and Phoenix.

Electrostatic seed cleaner

A NEW TECHNIQUE which will be a boon to the seed trade is incorporated in this first production model machine installed at Jacklin Seed Co. at Dishman, Wash.

It utilizes differences in electrostatic characteristics to segregate selectively seeds which cannot be handled by conventional screening machines. The inventor, James E. Crow, is adjusting the feed mechanism.



Propane as fuel for gas turbine locomotives

TESTS on Union Pacific freight locomotive between Los Angeles and Las Vegas show practically no maintenance required on turbine combustion system after more than 1,000 hours of operation, compared with necessity of inspection and replacement of some parts much more often when using Bunker C type fuel oil.

Also opens potential all-year market for hitherto-seasonal propane. Designed and constructed by The Fluor Corp., Los Angeles, in cooperation with General Electric, Richfield Oil Co. and the Union Pacific.

More on following pages

CONTRIBUTIONS OF WESTERN ENGINEERS

Their resourcefulness and ingenuity play a vital role in the West's industrial expansion

Concrete bases for jigs

BOEING Airplane Co., Seattle, has substituted them for steel on B-52 production line. Constructed with more accuracy, at one-third the cost and one-fourth the time required for steel bases.

Vibration of machine and truck traffic lessened; low expansion minimizes variation in jig alignments due to temperature changes. Also possible to mount two jigs on one base, saving space, without danger of transferring ◀ expansion from one jig to another.

Calculator-puncher device

COMBINED CALCULATOR and key punch device enable single operator to perform mathematical calculations and card punching jobs in one operation.

Developed by research personnel of the University of Denver, designed under sponsorship of E. Pat Davis, partner, Associated Business Services of Denver. In picture, Arthur M. Stiles, Denver Research Institute, ◀ demonstrates instrument.

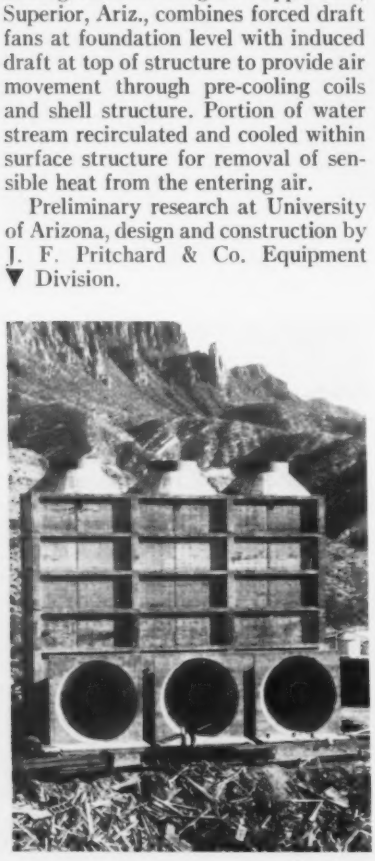
Long-distance cooling

THIS COOLING TOWER for recirculating water through air conditioning equipment located almost a mile underground at Magma Copper Co., Superior, Ariz., combines forced draft fans at foundation level with induced draft at top of structure to provide air movement through pre-cooling coils and shell structure. Portion of water stream recirculated and cooled within surface structure for removal of sensible heat from the entering air.

Preliminary research at University of Arizona, design and construction by J. F. Pritchard & Co. Equipment ▼ Division.

Accurate sawing guide

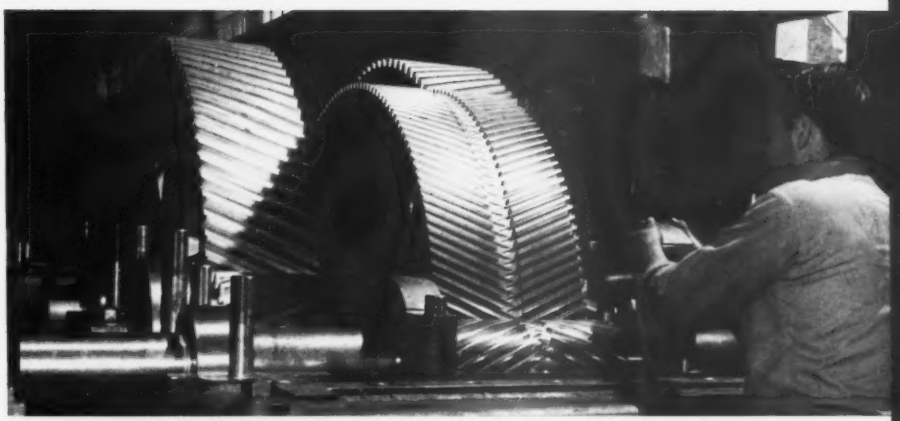
SHADOW LINE guide for sawmills with individual light and shadow bar for each saw, with position of shadow bar dependent upon position of corresponding saw. Enables accurate cutting, also utilizes maximum grade lumber from each board. Shown here, 44-ft. unit at Weyerhaeuser mill, Longview, Wash. Developed by F. W. Horstkotte of Bend, Ore., produced by Bend Iron Works. ▼



Speed reduction from 4,000 rpm. to 4 rpm.

IN REPLACING Corliss steam engines on Hawaiian sugar plantations with 400-hp. steam turbines, Western Gear at Seattle divided gear drives into three units at high, intermediate and low speed to provide total ratio of 1,000:1. This reduced 4,000 rpm. of the turbine to 4 rpm. at the mill.

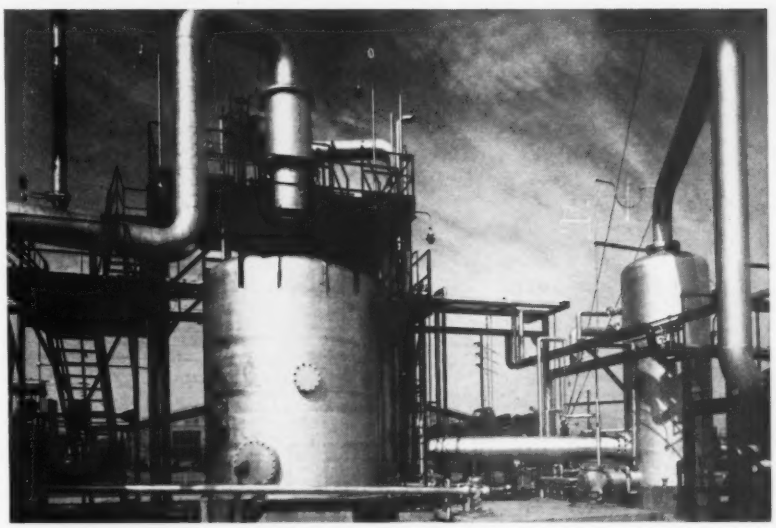
Double helical gearing prevents loss of power. Mechanical efficiency will exceed 98%.



Sulfur recovery system

TO RECOVER sulfur from natural gas, petroleum refinery gases and other sources, sulfur plants have been established throughout the United States, 15 of them designed and constructed by The Ralph M. Parsons Co., Los Angeles.

Here is a typical plant for making sulfur by catalytic conversion of the hydrogen sulfide in the gas being processed. The product usually is made into sulfuric acid, is used in large quantities for petroleum refining.

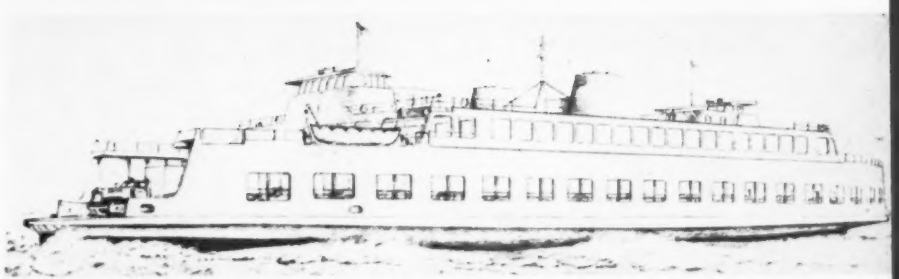


New look in ferries

IN NEW Puget Sound 100-car automobile ferry, framing produces V-bottom hull with no compound curves in plating or forge work in framing.

To provide no-slip speed for forward propeller, generators and motors are set up in a series parallel loop, thus slowing forward propeller by over-exciting forward motors.

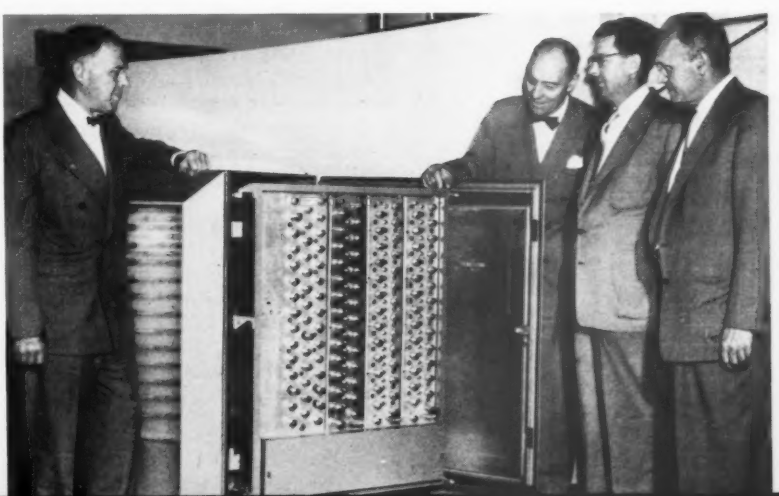
Cathodic treatment overcomes electrolysis and corrosion in salt water entering vessel. Designed by W. C. Nickum & Sons, Seattle, being built by Puget Sound Bridge & Dredging Co. for State of Washington.



Electronic "brains" for commercial use

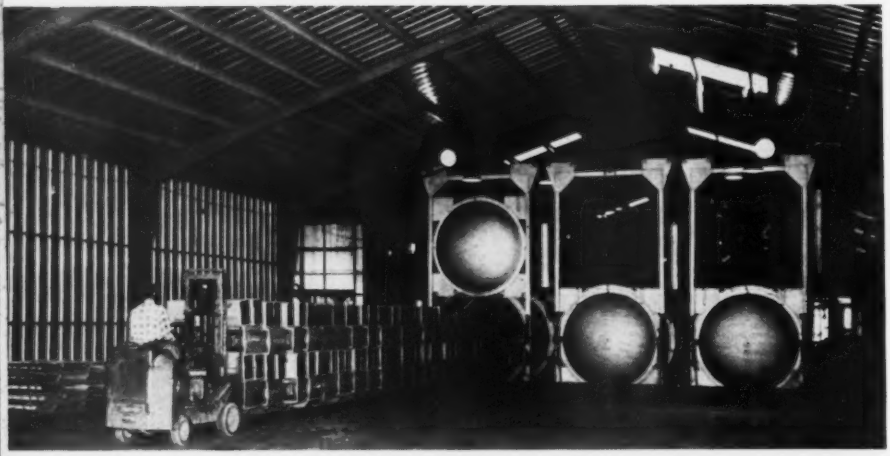
DESIGNED on same principles as much larger computers, the Miniac is a versatile magnetic drum computer housed in a cabinet 4 x 4 x 4 ft. Solves complicated mathematical problems, prepares payroll, controls inventory and other big figurework problems. Developed by Marchant Research, Inc., subsidiary of Marchant Calculators, Inc., Emeryville, Calif.

From left, H. T. Avery, v.p.-eng.; E. B. Jessup, pres.-gen. mgr., Marchant Calculators, ch., Marchant Research; B. Greene, pres., Marchant Research; Walter Kassebohm, v.p.-mfg.



CONTRIBUTIONS OF WESTERN ENGINEERS

Industry in the West advances as its engineers lift their vision to new and bigger achievements



Vacuum cooling of leafy vegetables

TRADITIONALLY lettuce shipped from California and Arizona fields to transcontinental markets is packed in iced wooden crates. Vacuum Cooling Co. (Salinas, Calif.) method is rapidly superseding, to an estimated total of 15,000 cars this season. It seems possible to treat similarly other leafy and thin-skinned products.

Now lettuce is packed in the field in fiber cartons and quick-cooled in vacuum chambers. Bunker ice alone keeps ◀ lettuce cool during shipment.

Pre-painting aluminum

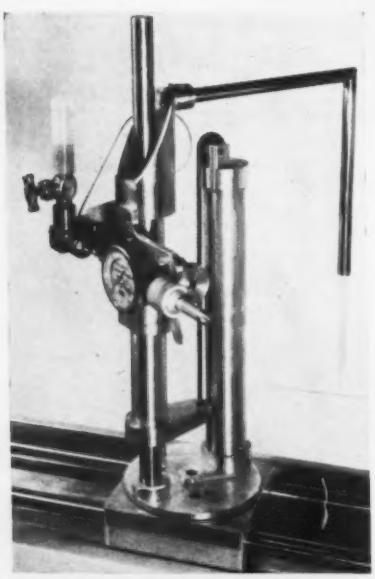
ONE STEP pre-paint treatment for ▶ aluminum insures adhesion of enamel on the treated base. Developed at Schwayder Brothers, Inc., of Denver, luggage and folding furniture manufacturers. Willard Axtell, chief engineer, devised.

Strips of luggage binding may be bent and twisted to metal failure without disturbing adhesion of the enamel. No drying of treated metal prior to dipping into the enamel.

Natural gas pipeline trouble overcome

CHEMICAL "scrubbing brushes" (diethylene glycol and monoethanolamine) remove hydrates which corrode and plug natural gas overland pipelines, but in turn vaporize, condense and cause plugging.

By passing the gas through a bed of activated bauxite in granular form, adsorption markedly reduced the pipe plugging. Dr. Thos. D. Nevens, associate research engineer, Denver Research Institute, under whose supervision problem was solved in cooperation with Stearns-Roger Mfg. Co. engineers, shown with test equipment. ▼



Remote pipetter

FOR REMOTE CONTROL manipulation of radioactive materials in maintenance and material handling work at the Hanford (Wash.) plutonium manufacturing plant, G-E scientists and engineers have developed many devices.

Here is a remote pipetter measuring one microliter of liquid with accuracy of $\pm 3\%$. Novel design aspects are remoteness of volume-indicating dial from pipette, provision of remote pipette-positioning controls and use of easily decontaminable teflon pipetters ◀ instead of glass.

Low cost glued lamination prefabrication

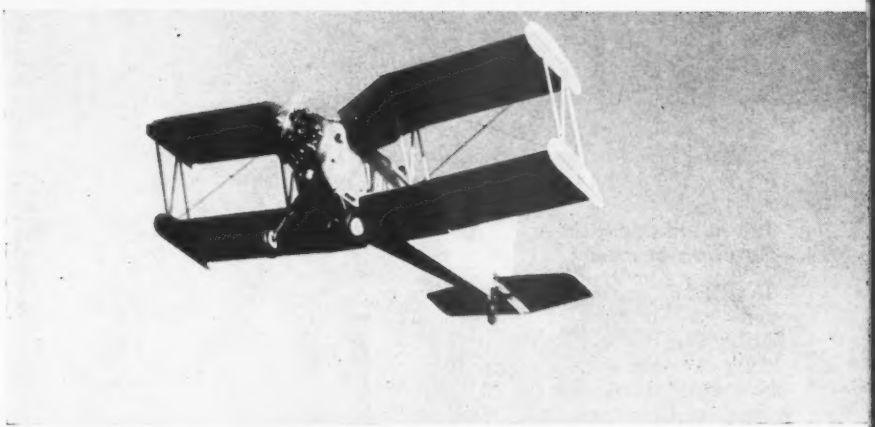
LARGEST building in the country using glued lamination arches and beams is 115,000-sq. ft. Lynnwood, Wash., junior high school. Auditorium-gym has 29 arches covering 88-ft. span at base inside, rising almost vertically, eliminating need for buttresses. Wm. Arild Johnson & Harry E. Botesch, architects, Everett, Wash.

Laid out on 4-ft. grid under modular plan, the design used almost entirely stock mill sizes of lumber. Total cost, $10.87 sq. ft.

Duster airplane for agriculture

INTENDED as a high performance airplane with 3,000-lb. payload, hopper at center of gravity to eliminate trimming as load is discharged, interchangeability of the four wing and six tail structures, wide range of cruising speeds.

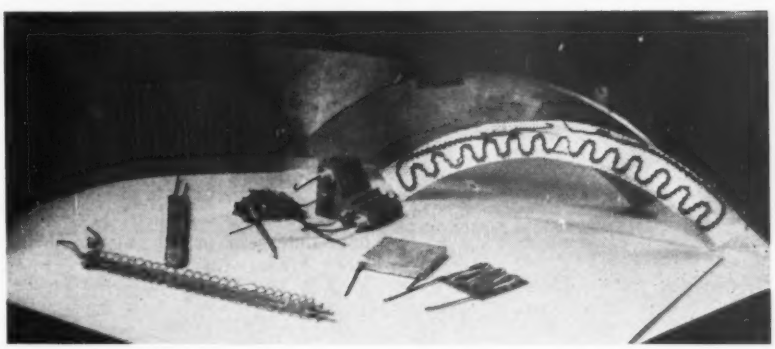
Performance and handling considerably exceeds design expectations. Designed by Central Aircraft Co., Yakima, Wash., engineered by Robt. Lawson, manufactured by Central-Lawson Corp., Yakima.



Flexible electrical heating method

SPECIAL flexible heating cable enables each user to make his own heating units and obtain any required heat distribution pattern, plus almost absolute heat uniformity, at reduced cost, without loss of life expectancy or volume of heat. Often the heating can be incorporated into the product itself.

Developed at Bacon Vulcanizer Mfg. Co., Oakland, Calif., by B. B. Sabouni, used by them for various heating requirements, including the production line.



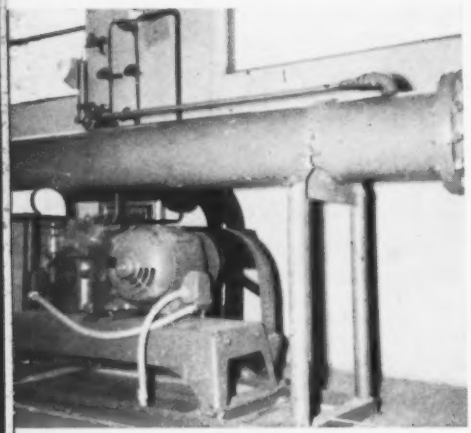
Mobile compressor-drill

MINING AIR lines are continually being moved to new locations, or inadvertently buried, twisted, constricted, broken, or are just in the way.

At Kennecott Copper Co.'s big open cut mine at Bingham, Utah, a crawler-mounted combination drill and compressor eliminated 60 mi. of 2-in. pipe plus 8-in. feeder piping from central compressor. Much greater output also resulted.

CONTRIBUTIONS OF WESTERN ENGINEERS

Entirely new principles, as well as techniques, are brought to light in their pioneer work



Sewage as thermal source for heat pump

HEAT PUMPS lack an adequate and reliable source of heat. Refrigerant or cooling medium coils may freeze; deep wells are expensive; lakes and streams usually remote and relatively cold in winter.

◀ At Lakeland Village, in eastern Washington, heat pump for the sludge-digester in a treatment plant gets heat from the sewage itself, which is only slightly colder in winter, also perpetually available as flow is virtually constant. Designed by Parker, Hill & Ingman, engineers, Seattle.

Increased aeration in flotation process

INCREASE in aeration up to five times demonstrated at the Getchell Mine, Red House, Nevada, in recovering tungsten from low-grade ores. New flotation cell operates with two impellers, the lower circulating the ore pulp to the upper, accomplishing aeration at low head, which facilitates disseminating air into the pump. Achieves results with less reagents and less power.

Designed and manufactured by Booth Engineers, Salt Lake City, Utah. ▼

Packaged detergent plant

BASIC ENGINEERING work on ▲ a detergent plant by Oronite Chemical Co., San Francisco, to process their "Alkane" into an industrial or household detergent or wetting agent for weed killers, was translated into a packaged plant by Industrial Engineers, Incorporated, Los Angeles.

Consists of four pieces of equipment which can be broken apart at the base by removing bolts, breaking pipe flanges between the units, and removing agitator drives. Plant can be reassembled in two days.

Automatic process control and monitoring

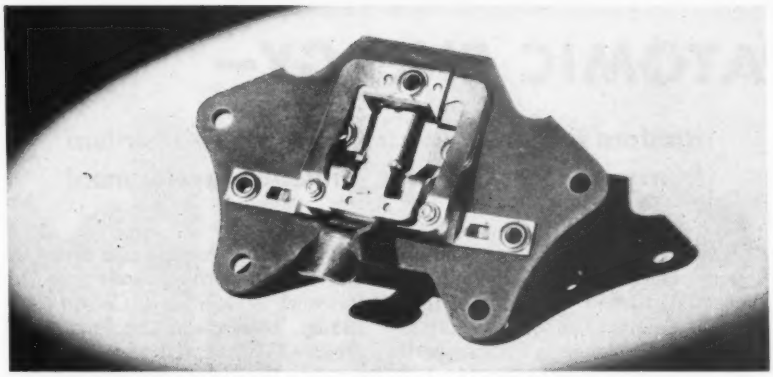
MASS SPECTROMETER, long one ▶ of the basic analytical tools used by petroleum and petro-chemical industries, goes automatic with Consolidated Engineering Corp.'s (Pasadena, Calif.) new model.

Analyzing a continuous stream of gases or liquids rather than a batch or sample, gives up-to-the-minute check. Combined with servo-mechanisms, not only can monitor but actually control process operations.

Reversible motor switch for single phase

CHARACTERISTICS believed impossible for single-phase fractional-horsepower motors are provided in the tiny Reverswitch, manufactured at Iron Fireman Electronics Division in Portland.

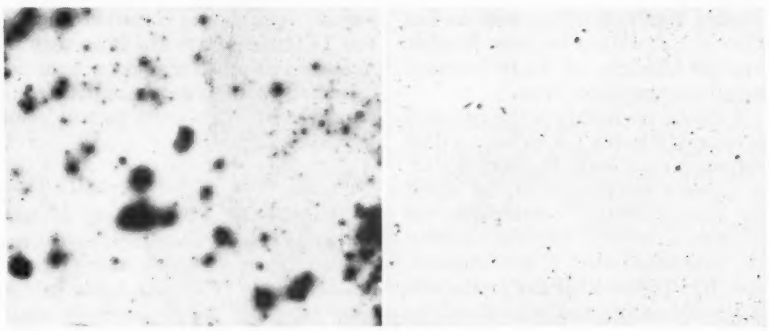
Will start the motor in either direction, also reverse it any time during operation. Heretofore a series of gears and mechanical linkages were required to instantly reverse a single-phase motor.



Fuel research

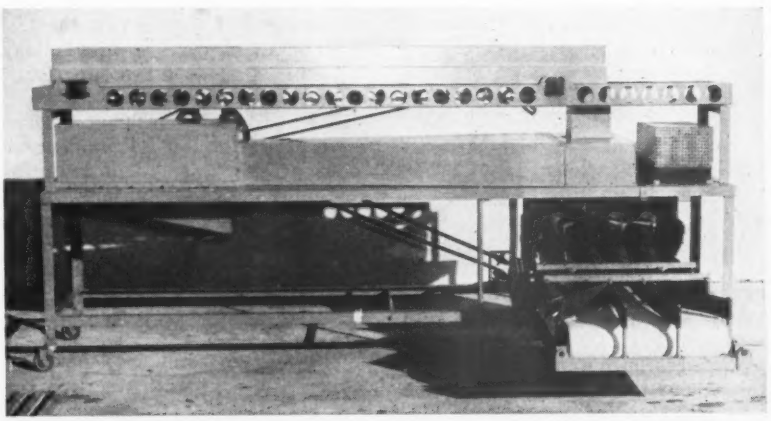
ELECTRONIC microscope research by Denver & Rio Grande, directed by Ray McBrian, gets marked economies in (1) unstable fuel mixtures not heretofore used in railroad diesels, (2) gasoline, jet and turbine fuels, (3) premium specification fuels which give trouble in road service.

New principle discovered: these fuels apparently not true solutions, but colloidal suspensions with constituent particles of variable size (left) which must be broken up and dispersed (right) to approximately 1/10 micron size by a dispersant.



Electronic lemon sorter

LEMONS color-ripen unevenly, require sorting for marketing. Electronic metering device sorts five lemons per second by light reflectivity. Developed by John B. Powers, agricultural engineer, University of California experiment station at Davis, assisted by Jack T. Gunn and Frederick C. Jacob. Remaining problem is to move inspected lemons out of the way fast enough.



Versatile tractor-loader

NEW TRACTOR-LOADER "turns around on a dime," because one track can be run forward and the other reverse. All gearing and clutches for speed changing and full independent reversal of each track contained in one compact unit.

Loader driven from front power take-off of the engine, has two-speed transmission, giving long-desired flexibility. Designed and manufactured by Eimco Corporation, Salt Lake City.

ATOMIC ENERGY—

Hanford is a "big industry" operation—Uranium frenzy speeds Colorado Plateau development

CONSTANTLY increasing output of plutonium at the mammoth Hanford Works in Washington, tremendous uranium mining and milling activity on the Colorado Plateau, and important technical and scientific developments at the Nuclear Reactor Testing Station in Idaho and the Los Alamos Laboratory in New Mexico, were the highlights of the 1953 atomic energy picture in the West.

A future possibility is the proposal of General Electric Co. to build a dual purpose reactor at the Hanford Works, to produce electric power, on which the Atomic Energy Commission has not made a decision. The AEC already has announced that it will contract with Westinghouse for the production of electric energy, probably elsewhere than in the West.

Operations in domestic uranium producing, as reported by Sheldon D. Wimpfen, manager of the Grand Junction, Colo., operations office, are scattered over an area slightly larger than the New England states and comprise the operation of more than 500 mines and nine milling operations.

In conjunction with this production activity, the AEC is carrying on what might be considered as one of the largest, if not the largest, full-scale organized exploratory effort ever undertaken. This is being conducted with approximately 300 men in the field scattered through some 25 field camps throughout the 107,000 square mile area designated as the Colorado Plateau.

Airplanes for exploration

In addition to the ground crews, nine airplanes are used in this exploratory effort. Physical exploration under government auspices employs some 50 to 60 drilling rigs and probably private industry has even more rigs in operation.

The reconnaissance airborne program is primarily a spearhead operation in unprospected areas believed favorable for urainum deposition. The principal value of this program is in locating ground anomalies as a point from which ground reconnaissance work may start.

AEC has in operation six planes which require 24 men. Each unit is made up of a pilot, observer geologist and a ground geologist and an assistant. The standard equipment used for this work is Piper Super Cubs, PA-18, 135-hp. planes and Nuclear Enterprises—Mark 6 instruments manufactured in Winnipeg.

Low level flying is required for this work, averaging in elevation from 50 to 75 ft. The traverses flown may be along rims or on a grid pattern, depending upon the nature of the terrain and the areas believed favorable for uranium deposition.

Private prospecting

To stimulate prospecting in new areas in which anomalies have been found, each airborne unit reports monthly the anomalies found, which are compiled on an anomaly map. These maps are posted on the 15th day of each month at 12 noon or the following work day, in case the 15th falls on a non-work day or a holiday, at some 25 announced posting localities. These announcements have been followed closely by the public and have been of considerable value in encouraging private exploration in new areas.

Uranium processing mills, which ship the crushed and treated ore to the eastern part of the United States for refining, are listed as follows:

Anaconda Copper Mining Co., Grants, N. M.
AEC-Galigher Co., Monticello, Utah
Climax Uranium Co., Grand Junction, Colo.
Kerr-McGee Co., Shiprock, N. M.
U. S. Vanadium Co., Rifle and Uravan, Colo.
Vanadium Corp. of America, Durango and Naturita, Colo.
Vitro Chemical Co., Salt Lake City, Utah.

Two processes, acid and carbonate leach, have been employed. Advantages and disadvantages of each may be summarized as follows:

The acid leach has the advantage over carbonate leach of higher uranium and vanadium extractions with a less costly chemical. This advantage must, however, be balanced against higher initial equipment cost, increased maintenance cost and a more hazardous operation.

While the uranium extractions are higher than those obtained with the carbonate leach process, it is considerably more difficult to recover the extracted uranium in an acid process as

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19 No. 4th Street, Phoenix, Arizona
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1533 India Street, San Diego, Calif.
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940 Broadway, Eureka, Calif.
Phone: HI 2-4516

920 "M" Street, Fresno 18, Calif.
Phone: 6-8231

900 Alice Street, Oakland 7, Calif.
Phone: TE-2-4200

1801—22nd Street, Sacramento 4, Calif.
Phone: HI 6-3841

P. O. Box 969, Salinas, Calif.
Phone: 2-4771

605 Old County Road, San Carlos, Calif.
Phone LY 3-7631

165—8th Street, San Francisco 1, Calif.
Phone: MA 1-6800

695 Stockton Avenue, San Jose, Calif.
Phone: CY 2-3606

251 Roberts Avenue, Santa Rosa, Calif.
Phone: S.R. 6400

1234 So. Aurora Street, Stockton 8, Calif.
Phone 4-4841

1595 E. 2nd Street, Reno, Nevada
Phone: 2-6907

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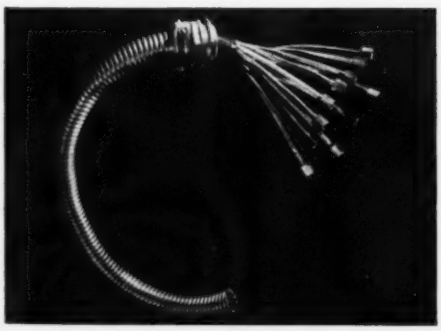
For the new pneumatic instrumentation

Cabled Tube

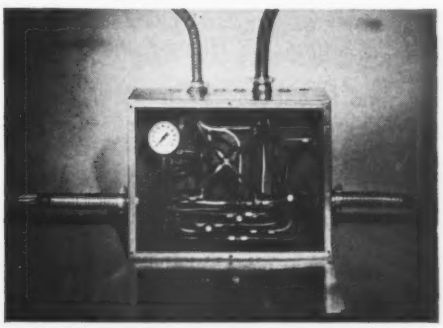
The recent tremendous increase in the use of tube instead of wires for instrumentation and control purposes has led to an important new development—cabled tube. This is an armored group of long tubes twisted together to permit bending without distortion. An insulating tape is wrapped over the bundle of tubes to prevent electrolytic action. Then interlocking, flexible galvanized steel armor is applied, like BX. This protects the tubes from injury during shipment, storage, installation, and in service. Standard fittings, boxes and cabinets can be used for junction boxes and terminations. To make it possible to readily identify each tube, one tube in each layer is colored; the position of each tube in each layer in relation to the coded tube



remains the same throughout the length of the cable.

The tubes usually are copper, but aluminum tubes can be used for special purposes. For unusually corrosive situations, a plastic outer sheath can be applied. As many as 19 tubes, ¼" OD, can be cabled, and supplied in lengths up to 1,000 ft.

Since the tubes carry not electricity but air, nitrogen, helium, or a fluid, they are especially attractive in potentially explosive locations, as in refineries and chemical plants. Utilities are also turning decisively to this new cable, while automatic process control (automation) is a rising application.



Revere, as a supplier of tube for this purpose, calls this cabled tube development to your attention as a matter of general and perhaps specific interest. See Revere for copper, aluminum and brass tube and pipe, electric welded steel tube, and lockseam tube. Call the nearest Sales Office.

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Showing the construction of Crescent Armored Multitube, made by Crescent Insulated Wire and Cable Co., Trenton 5, N. J., which will supply further information on request.

the products produced have extremely poor filtering and settling characteristics. However, newer precipitation methods and other developments are eliminating this disadvantage.

Carbonate leach, therefore, while not extracting as much uranium and vanadium on normal ores, does have the advantage of less costly capital investment and cheaper maintenance costs as well as less hazardous operation. The uranium and vanadium once extracted are virtually completely recovered with a smoothly operating precipitation process.

The acid process has one important advantage in that it is more generally applicable to a greater variety of ores, which is important where ores are being treated from a number of mines.

Hanford, Wash.

About $150,000,000 worth of construction work is under way on the Hanford project for the Atomic Energy Commission.

Largest of these direct contracts awarded by the AEC is the $110,000,000 construction job being handled by Kaiser Engineers Division of Henry J. Kaiser Co., for new production facilities within the Hanford barricades.

Second largest contract is a $40,000,000 job held by Blaw-Knox Construction Co., for building a new chemical processing plant inside the area.

A $14,200,000 laboratory area, under contract to L. H. Hoffman, Sound Construction & Engineering Co., Seattle, has been completed.

Current expansion of the Hanford Works requires immense quantities of concrete and steel; 303,850 cu. yd. of concrete will go into the new plants while structural and reinforcing steel used will amount to some 21,272 tons.

Due to the highly classified nature of Hanford operations, it can only be indicated that plutonium production in the past year has increased while the cost per unit of production has decreased.

Total volume of production of fissionable materials and weapons is increasing rapidly. Between fiscal years 1947 and 1952 the average unit cost of plutonium was cut more than one-half and the unit cost of uranium 235 reduced even more. Further technological improvements will continue to provide even lower unit costs for production in later years.

Kaiser engineers have already committed more than $35,400,000 for purchases and sub-contracts. Of this amount, over $30,000,000 has been placed in the three West Coast states and nearly $18,000,000 in Washington alone. The $35,400,000 represents 5,832 separate business transactions, of which 5,601, or about 96%, are for purchases of material and services from West Coast firms. Every opportunity is being given small businesses employing less than 500 people. In this category, 4,657 transactions were made for a total of $15,000,000.

Idaho Falls

A quick digest of the top activities in 1953 at the National Reactor Testing Station near Idaho Falls, Idaho, is as follows:

It was announced that the Experimental Breeder Reactor had achieved a goal of successfully breeding at least as much new fuel, in the form of plutonium, as its chain reaction consumed.

The Chemical Processing Plant, incorporating a number of new design concepts expected to produce data important to the economics of reactor utilization, was put in operation. It was designed to permit decontaminating individual cells, thus simplifying maintenance, to provide for removing radioactive materials from gases generated in the chemical process, and to process fuel elements from a variety of reactors. This plant was operated at the outset by American Cyanamid Co., but subsequently by Phillips Petroleum Co.

A program of test operations was started on the Submarine Thermal Reactor, which will serve to train the crew of the USS Nautilus and to determine the operating characteristics of the submarine's power plant. This is a joint Argonne National Laboratory-Westinghouse project.

Construction was started on the first phase of facilities for the ground testing of a nuclear aircraft engine. Utah Construction Co. of Salt Lake City was awarded the contract, for $4,583,000.

Rocky Flats

The AEC's Rocky Flats plant near Boulder, Colorado, will cost almost $1,500,000 less than the original estimate of $45,000,000.

Los Alamos

At Los Alamos, New Mexico, there was completed during the fiscal year of 1953 construction and architect-engineer work in the Technical Area totaling $25,975,000, of which the largest proportion was spent on facilities for various technical processes. Some $13,580,000 worth of technical related contracts were finished in the fiscal year of 1954 prior to November 30, 1953. Some $8,000,000 worth of Technical Area contracts are shortly to be awarded, following competitive lump-sum bidding; these will include a $6,000,000 General Administrative and Laboratory Building and a $1,175,000 Cryogenics Laboratory, as previously announced.

Sandia

At Sandia Laboratory on Sandia Base at Albuquerque, New Mexico, most recent construction has been in the Technical Area. There was completed some $1,500,000 worth of work, including a $1,074,000 Engineering Building. There was also under contract or completed some $2,753,000 worth of work, including a $1,058,000 addition to the Engineering Building, and a $690,000 Maintenance Shops and Warehouse Building.

CLAY PIPE—

Better jointing results from research; marked trend toward mechanizing production steps

IN VIEW of the ever-increasing cost of labor, there is a definite trend in the manufacture of vitrified clay pipe to mechanize the operations as much as possible. This trend is quite noticeable in the handling of the pipe through various stages of manufacture, drying, firing, storing and ultimate delivery to the user.

There is no basic change in the raw materials used in the manufacture of vitrified clay pipe. There is continuing emphasis, however, on more uniform crushing, grinding and blending of clays. Attention to these operations are important means of improving the quality of the finished product.

New jointing techniques

The vitrified clay pipe industry is keeping abreast of present day requirements for sanitary sewers by carrying on continual research in an effort to constantly improve the product and develop better and more economical methods of jointing sewer pipes. Several new types of jointing techniques are now available as a result of the research program.

Estimated annual volume for the three Coast states is reported by J. J. Stein, secretary-manager of the Pacific Coast Clay Products Institute, as follows:

Year	Tons
1953	290,000
1952	275,000
1951	286,000
1950	250,000

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OIL—

Domestic exploration and development curtailed in the face of the flood of foreign petroleum

THE SUPPLY and demand outlook for 1954 is radically different from that which the industry in the West faced a year ago. Instead of concern over inadequate supplies to meet projected demand, industry is now faced with a serious over-supply situation.

Current over-supply is principally the result of high imports prevailing during 1953. Total petroleum inventories have risen to more than 120,000,000 barrels, the highest level since late 1949. Total supply is estimated at 220,000 barrels per day or 68,000 b/d. total demand. Of this supply crude imports amount to 75,000 b/d.

Prices of crude and oil products were higher than a year ago and total demand for all oils increased about 46,000 b/d. or about 4%.

In an effort to reduce inventories, cutbacks in production and oil field development are occurring. If imports continue at anywhere near current levels during 1954, domestic production will have to be shut down further. Imports are expected to drop considerably and even at 25,000 b/d. level, total stocks will continue to increase.

Imports to drop

A narrowing level of imports during 1954 will leave little room for imports from Canada via the new Transmountain pipeline. Although curtailment of oil field development should be considered a short run situation, in view of the West's continually growing demand for petroleum products, it is a serious threat to the independent oil producer because of its threat to the petroleum price structure.

Should development incentives be reduced by a break in prices, the industry would be faced with the very real problem of how to find and develop domestic reserves for possible future emergency when foreign imports might not be available. It is hoped that the industry will solve its problems by reducing imports to levels which supplement but do not supplant domestic supplies.

Increase in total demand for 1954 is estimated at only 2%. This lower rate is attributed to lower business activity and a decline in residual, both for domestic and export purposes, due to its greater availability in British Columbia. This picture, however, might be changed by the development of possible new offshore production as a result of the settlement of the Tidelands question.

Another important factor in Western oil will be the development of a new refinery center in the Northwest. Original capacity will be 85,000 b/d., but considerable growth is expected in the late 1950's. The new refining facilities will go into operation around mid-1955. The new supply of crude oil will be moving into the Pacific Northwest area from Alberta, Canada, and oil products will move in from the Rocky Mountain area. The Pacific Northwest, including British Columbia, was once supplied almost entirely from California. Total petroleum demand for this area currently approaches 300,000 b/d.

Northwestern demand

Demand in the Washington and Oregon areas for residual fuel amounts to 80,000 b/d. (1955 level) and on top of this there will be an estimated distillate demand of about 70,000 b/d. and a gasoline demand in excess of 100,000 b/d. The new refinery capacity, then, will be able to meet only 30% of the total demand for the area.

Growth of crude production in the Rocky Mountain area continues, bettering considerably the rate for the rest of the nation. The expansion of product pipeline capacity into the coastal states has permitted higher local refinery runs and use of local crudes. Rocky Mountain area production averaged about 358,000 b/d. for 1953, an increase of 50,000 b/d. over 1952. With continued heavy drilling activity in this area, it is estimated that production in 1954 may approach 400,000 b/d., an increase of over 10% as compared with only 2% for the nation as a whole.

Total production in Montana (Williston Basin area) increased over 20% in 1953 and a similar increase may again occur this year. A lesser increase than occurred this year is expected in Wyoming, and Colorado production may again be up 20%.

The market for Rocky Mountain area crude is expected to expand faster than the industry for many years. This is a logical step in the development of new crude reserves for the nation since the area is both large and relatively new with ample room for continued exploration and development.

Rated crude capacity of U. S. refiners[1]

(thousands of b/d[2])

Districts	Jan. 1, 1953	Jan. 1, 1955	Increase	% Incr.
Atlantic Seaboard	1,245	1,406	161	13
Lake and Middle Western states	2,144	2,359	215	10
Gulf Coast and New Mex.	2,827	3,036	209	7
Colo., Ida., Mont., Utah, Wyo.	262	266	4	1½
Ariz., Calif., Nev., Ore., Wash.	1,256	1,338	82	6½

[1] Figures shown include assured projects reported to Petroleum Administration for Defense as of April 1, 1953.

[2] Capacity is expressed as maximum average daily throughput obtainable from both operating and shutdown units with allowance for normal downtime for repair, etc.

Pacific Coast
Anticipated demand increase in 1954

(thousands of b/d)

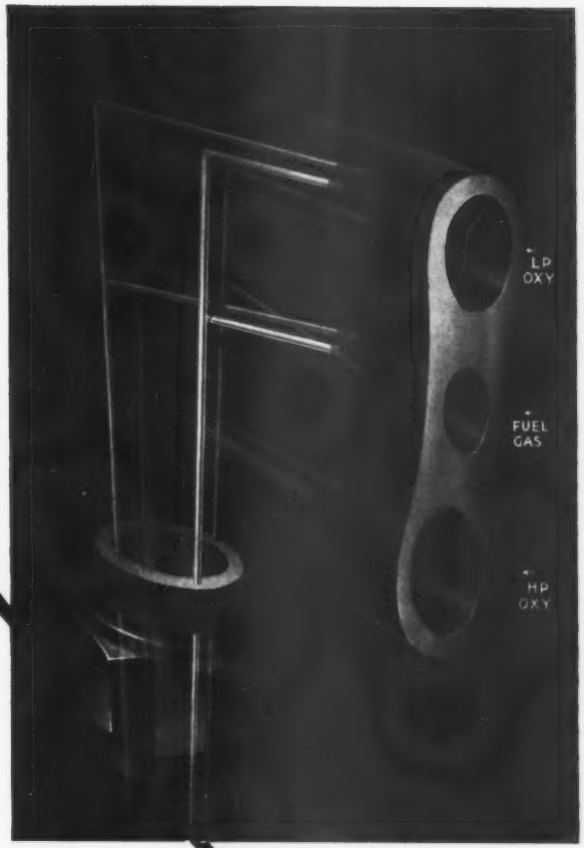
	1953	1954	% Change
CIVILIAN DEMAND			
Total petroleum	988	1,024	+3.6
Crude oil	2	2	—
Natural gas liquids	29	29	—
Gasoline and naptha	410	430	+4.9
Stove and diesel oil	141	142	+0.7
Fuel oil	303	315	+4.0
All other	103	106	+2.9
MILITARY DEMAND			
Total petroleum	80	77	—3.8
EXPORTS AND INTERCOASTAL			
Total petroleum	89	85	—4.5
Pacific Coast—			
Grand total demand	1,157	1,186	+2.5

Wyoming is enjoying the greatest concentration of drilling activity in the Rockies. The Big Horn Basin is currently the leader of Wyoming's many producing areas. Both the Rocky Mountain area and the Pacific Northwest oil industries will be greatly affected by the FPC's choice of a gas supply for the Pacific Northwest. The advent of natural gas in the Northwest is expected to displace 20,000 to 25,000 bbls. of petroleum fuels per day.

Although the domestic market is at present over-supplied, some refinery people maintain that winter will wipe out the surplus.

The modern automobile engine with its constantly increasing compression ratio calls for higher octane gasoline every year. Meanwhile standardized specifications for jet propellants have been rushed with refiners considering ways and means of producing for this market. At mid-year the Petroleum Administration for Defense put the aviation gasoline shortage at 30,000

this finer cutting torch



multiple mixer in torch head... it offers greater safety and greater efficiency...

A cutting torch mixer may be located either within the torch handle, the torch tubes or the torch head. When located within the handle or the tube, the mixer is situated in close proximity to the operator's hands; no torch, however, need be held by its head.

And, besides, there is plenty of metal in that torch head to permit for an added advantage: Multiple Mixing. By breaking up the streams of the low pressure oxygen as well as the fuel gas into several separate channels, the port diameters are lessened, thus offering greater flash-back resistance.

This modern, patented, Multiple Mixing in the torch head is costlier to manufacture but it eliminates the need for a separate mixer, leaky seats and joints, and years of experience in shop and field have proved the outstanding excellence of this patented design feature.

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834

b/d., and was urging the need for more alkylation capacity.

This need for obtaining more of the volatile aromatics from the same crude petroleum has resulted in the adoption of catalytic reforming by which chemists regroup the molecules into higher quality fuels and at the same time eliminate troublesome sulfur.

New installations

At the present time catalytic reforming installations built, planned or under construction number nearly 100. Western expansion includes Shell's projected 4,500 b/d. platform unit at Martinez intended to boost low octane stock as much as 25 octane numbers, and others by Standard Oil, Richfield, Union and General Petroleum in California, and Malco Refineries at Prewitt, New Mexico.

It is estimated that if platforming, a catalytic reforming process, wherein platinum is used as the catalyst, was applied industrywide, output of the nation's gasoline would be raised by only about 3%. However, by feeding a crude oil fraction high in methycyclopentane and cyclohexane, refiners can obtain high yield of benzene, toluene and xylenes, vital to the synthetic rubber, explosives and chemical industries. Also derived are such valuable intermediates as para-xylene, used in the production of synthetic fabrics such as Dacron.

In order to offset sagging prices for fuel oils, refineries are finding new ways of converting heavy crudes into more marketable products. The need for increased conversion is redoubled by the decrease in demand of fuel oil by the railroads due to dieselization. Hurt most are small refineries located where transportation costs make heavier fuel oils hard to market profitably.

Strong demands to reduce the flow of foreign oil have been made to Congress, and late in 1953 some of the major companies voluntarily reduced their oil imports.

Chemists know that with the proper equipment they can get less fuel oil and more high grade products out of heavy crude oil by fuel oil recracking; propane decarbonization, with propane as a solvent to separate asphalt and other undesirable components. Other processes involved are deep vacuum flashing; thermal reforming at very high temperatures; and various coking processes.

Remodeling expensive

But many small companies cannot afford the substantial plant remodeling required, and the present trend is toward expansion of the large refineries but a shrinkage among the smaller ones. The smaller plants, which at the end of World War II represented almost half the U. S. refining capacity, now account for about one-sixth, and many small skimming and cracking plants are shut down.

Shell Oil came up with its TCP additive for reducing pre-ignition and otherwise improving gasoline performance. Many other companies were waiting to gauge public acceptance of the new product at year's end.

It is believed that most companies will either go to higher octane or market additives of their own. Ethyl Corporation, which supplies most of the tetraethyl lead to the industry, has developed a phosphate additive, as has DuPont.

Fastest growing part of the industry is the petro-chemical field. Considerable research is being conducted on detergents and paraxylene, the base material for Dacron. Benzene, used primarily in synthesizing detergents and synthetic rubber, has had its price doubled in recent years through increased demand.

Phenol, a base for plastics, has been under intensive study and several large manufacturing plants will go into production near the first part of

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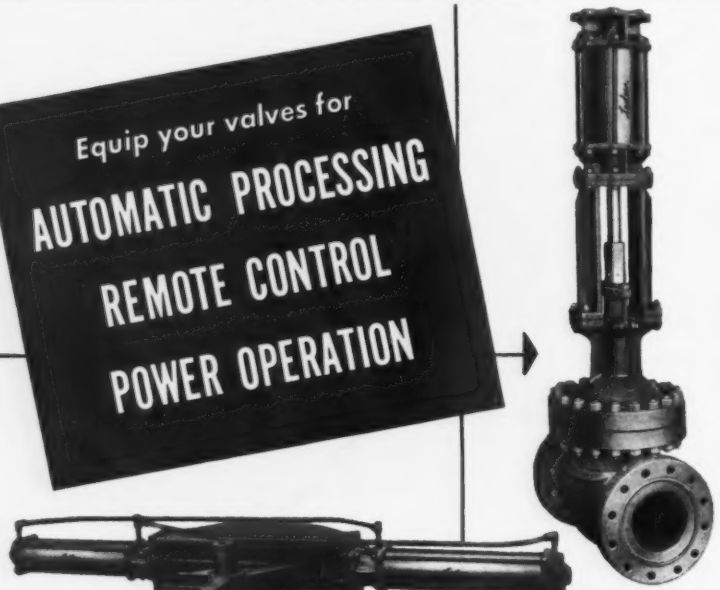
REMOTE CONTROL
POWER OPERATION



(Above) High Pressure Gate Valve with Ledeen Valve Actuator.
(Left) Ledeen Tandem Type Valve Actuator on Standard Plug Valve.

with
Ledeen VALVE ACTUATORS

★ Simple, Rugged Construction.
★ Few Moving Parts.
★ Easily Installed.
★ Prompt Delivery.

These actuators are for the automatic operation of gate, diaphragm, plug and other line valves, and are pneumatically or hydraulically operated for direct or remote control. Designed as package units, they are mounted directly on the valves without need of special manifolds or outside supports. They are easily, quickly and rigidly installed on new valves or on valves in service.

Ledeen Valve Actuators provide positive operation, permit automatic processing, safety installations, multiple central control ,and require a minimum of maintenance. WRITE FOR BULLETIN 3000.

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VALVE ACTUATORS
AIR HYDRAULIC
PUMPS & BOOSTERS

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this year. There has also been considerable interest in plywood glues and plastic films.

By-product utilization is still one of the chief concerns of the industry with the market for LPG, propane, and butane increasing every year.

Current oil research may benefit other industries in the West. Standard Oil Development Co. has brought out a fluidized solids process in which catalysts are poured in dense form into a stream of vapors, by-passing many of the mechanical problems associated with the use of fixed beds of catalysts.

The basic principle may be extended into calcining of limestone, coking of coal, activation of carbon, manufacture of water gas, and destructive distillation of wood and sawdust. Stanford Research Institute has already worked on fluidized carbonization of redwood sawdust and is looking forward to by-product utilization of this Western waste material.

The past year saw extensive use of air or natural gas as a substitute for the traditional circulating mudstream used in well drilling. In some formations it is said to mean faster drilling, longer bit wear, and better production of core samples.

Rapid growth of pipeline networks continues and there is a strong trend toward making their operation at least semi-automatic. Many pumping stations can be either remote controlled or guided through mechanisms actuated by the pipeline stream itself. Microwave radio channels and multiplexed wire systems carrying 8 to 12 voice frequencies link dispensing centers to keep fuel gases and liquids moving on time.

RICE—

California mills enjoy record year — 46% of milled head rice goes into export

CALIFORNIA rice mills enjoyed their banner season in the year ending September 30, 1953, due to large rough rice supplies available and milled rice in active demand. The rough rice milled produced a record total of 7,619,145 cwt. of milled products, 4% above the previous year. Average production for the ten previous years was 4,506,051 cwt.

Exports continue to be the main outlet for California milled head rice, accounting for about 46% of the total distribution. Exports through regular trade channels were considerably below the previous year, but this was largely offset by larger shipments by government agencies.

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Excellent shipping facilities are offered by the Port of Long Beach. The many fine mechanical advantages are happily supplemented by the equable climate, of major importance to all shippers and offering many savings.

Ample paved outdoor storage areas are a feature of the Port of Long Beach. During peak periods, overflow cargoes are safely stored outdoors. At various times you will see hundreds of automobiles, tons of steel products, citrus fruits, cotton bales and many other shipments in the open without need of our fine transit sheds and shipside warehouses.

Better working conditions, no frozen cargoes, no slowdowns from excessive heat are a few of the dividends from our famous climate. Mother Nature has been very good to us. But even so, we have given her an assist. The entire outer harbor is protected by a solid-fill mole 600′ wide which has eliminated all rough water and resulting surge. In addition, the world's longest breakwater gives added protection and extensive safe anchorage. And we have a very gentle tidal range of only 6′.

Nature's Air-Conditioning Helps Industry

Industrial plants also benefit from the air-conditioning that is done by nature. The air is fresh, and cleared by invigorating ocean breezes. Mechanical cooling devices are not necessary (except for critical processing). The excellent living and working conditions result in lower absenteeism and reduced turn-over, as well as higher working efficiency.

The "industrial climate" also offers fair weather the year round. Really low-cost utilities, advantageous tax-structure, lower costs for land and building, an exceptional labor pool, excellent transportation facilities and America's most modern port — all add up to sunshine on your profit ledger.

Write for free industrial brochure and complete details — in confidence, if you like. This invitation is extended by the City of Long Beach and its Board of Harbor Commissioners.

CHAMBER OF COMMERCE • DEPARTMENT OF INDUSTRY

200 East Ocean Boulevard, Long Beach 2, California

ELECTRIC POWER—

Encouraged by government policies, Northwest proposes new plans to end power shortages

THE PACIFIC Southwest (Arizona, Nevada, Central and Southern California) shows one of the brightest electric power pictures in the entire nation. In contrast to this, the electric power outlook for the Pacific Northwest is one of the poorest.

Estimates of capacities as compared with peak demand, in megawatts, from the FPC:

	REGION 7 (Pacific Northwest)		REGION 8 (Pacific Southwest)	
Year	Peak demand	Dependable capacity	Peak demand	Dependable capacity
1951	5,505	4,916	6,272	7,132
1952	5,456	5,549	6,841	8,044
1953	6,956	6,488	7,582	8,564
1954	7,866	7,542	8,260	9,899
1955	8,387	8,317	8,791	10,875
1956	8,847	8,761	9,367	10,965
1960	10,900	—	13,500	—

A margin of generating capacity over demand in the former is shown to vary between 15% and 23% for the years 1952 through 1956. Normal adequate reserves to meet a national emergency or war are considered to be 15% or better. These margin percentage figures cover all power fed into the area from hydroelectric and steam generating plants, as well as power imported from other areas.

Since 1948 the Pacific Southwest area has greatly increased its steam generation potential so that it is now in a position to meet any peak demand or emergency. The Pacific Northwest, however, has little enthusiasm for building steam plants while hydroelectric power potential exists. Although there is little hope for any great amount of additional hydroelectric power being provided in the near future, the price differential so favors hydro power that as long as there is a possibility of its being available, steam plants will probably not be built.

The following chart shows how the Pacific Southwest has firmed up its generating capacity by constant expansion of steam generating facilities. These steam facilities have been the chief contributor to the present high margin of overall capacity over peak demand.

Year	Steam generated in thousands of kw.	Per cent of overall capacity, including hydro, over peak demand
1952	4,023	23.0
1953	4,626	15.1
1954	6,000	18.6
1955	6,743	19.8
1956	7,125	16.6

With the change in administration, the Department of Interior evolved a new policy departing from the Democratic Party tradition of dominating the power scene, and has now divested itself of any obligation to provide the Northwest with additional power facilities.

The Interior Department has offered privately owned utilities a new long-term contract telling them how much federal power they can expect to get for the next 20 years. In addition, the contract would, in effect, put a ceiling on the size of the industrial customer that could get power from the government, privately owned utilities or public agencies.

The government next offered to form a sort of partnership with public and private utilities to build dams and develop more electrical energy in the region. Department policy exhibits the attitude of refusing to accept the responsibility for the public utility situation in the Pacific Northwest and it remains to be seen just what Congress will do in establishing more definite policies.

Governors of Montana, Idaho, Washington and Oregon have met in an effort to determine their group needs, and Washington State has set up a Power Commission of five members to investigate the needs of the area.

In early December six private power companies formed an informal joint venture to build dams in the Pacific Northwest, taking up the federal government on its partnership offer. The companies involved are Pacific Power and Light Co., Portland General Electric Co., Idaho Power Co., Washington Water Power Co., Mountain States Power Co. and Montana Power Co.

In an earlier period there appeared to be a surplus of power in the Pacific Northwest and large aluminum companies were encouraged to locate there. No great growth of the firm load was predicted at the time these power-hungry plants were installed and it was assumed that the government would provide any additional power the region might need in the future.

Unfortunately, however, the region's power load has increased by 8-10% each year since the war, and the government's absolving itself of responsibility to build dams and provide power has left the area facing a power shortage. The established load growth has increased from the 1952-1953 peak capacity but will only see the area through the 1953-1954 peak demand period.

Under present federal law the chief responsibility to provide power falls to public utility agencies. Present industrial users of electricity get the second shot at government kilowatts while third in line are private utilities. Any new industries wishing to locate in the area will only be allowed if their loads are less than 10,000 kw., and the government will refuse to supply power to any utility or sell to new industries needing more under the current law.

At present, the Northwest power pool can be divided into two groups, the Western group covering Washington, most of Oregon and the panhandle of Idaho, and the Eastern group taking in the rest of the Pacific Northwest. The Eastern group has satisfactory power capacity while the Western group is feeling the pinch.

Peak demand and dependable capacity in megawatts, as reported by Western group to the Federal Power Commission:

	Peak demand	Dependable capacity
1953	5,456	5,055
1960	8,650	7,977

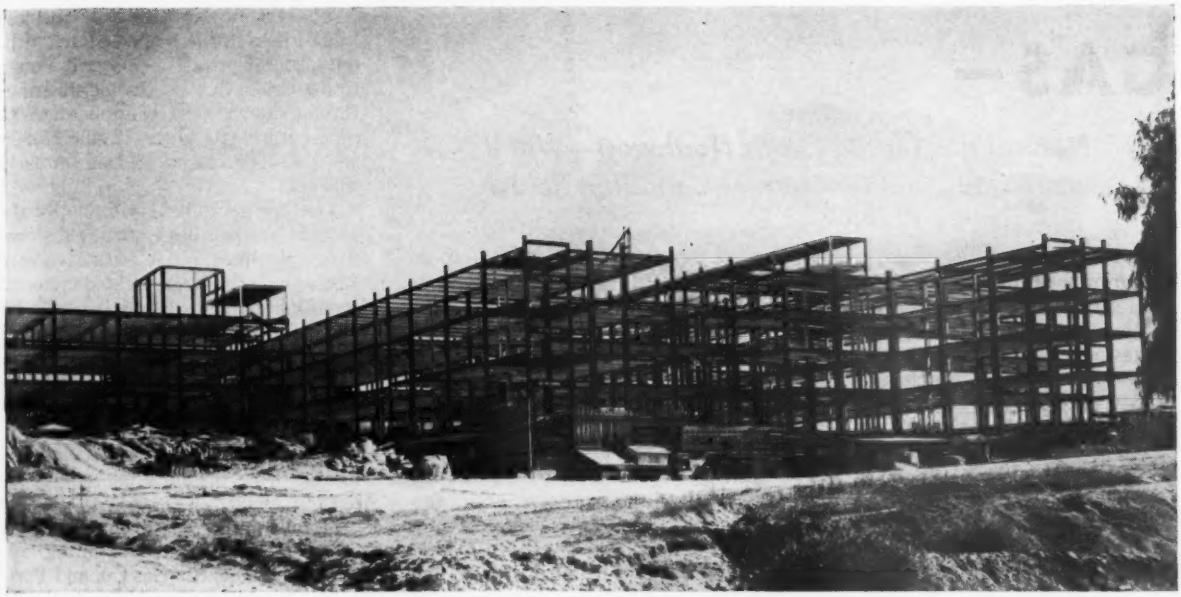
The 1953-54 operating program of the Northwest Power Pool indicates that all West group firm energy load can be carried with stream flows at critical levels. It may be necessary to curtail the major part of the interruptible load during the storage draft season, however.

The Eastern group, on the other hand, enjoys a favorable outlook. Factors that make this group more secure than the Western group are: (1) Steam generating facilities; (2) no aluminum or other electro-chemical industries to drain vast quantities of power; (3) better balance of industrial load so that daily and seasonal fluctuations are not great; (4) a difference in time zone within the area helping to further distribute demand peaks. Of the 400,000 to 500,000 kw. currently on interruptible schedules in the Pacific Northwest, 99½% of this is aluminum, the remainder being made up of magnesium and salt industries.

Mountain states

The following are the latest load estimates for Colorado, Wyoming and New Mexico, in megawatts.

Year	Colorado	Wyoming	New Mexico
1952	516	137	204
1953	570	150	220
1960	925	230	320
1970	1,520	390	480



FOR MEDICAL RESEARCH . . . This new building in West Los Angeles will provide 710,000 sq ft of additional floor space for medical research at the University of California at Los Angeles. It is designed to carry extra floors when future expansion becomes necessary. Architects are Welton Becket and Associates. Structural engineers: Murray Erick Associates. General contractor: Robert E. McKee. Bethlehem Pacific fabricated and erected the 3,987 tons of steelwork.

Steel for Western Construction

Bethlehem Pacific has complete facilities for fabricating reinforcing bars and structural steel . . . and sells the most complete line of steel construction materials in the West.

• • •

$6,700,000 ELECTRONICS BUILDING . . . 2200 tons of Bethlehem Pacific reinforcing bars are going into the new five-story electronics building at the Mare Island Naval Shipyard at Vallejo, Calif. In the section of the building shown, about 50 columns are being built in an area 200 ft by 168 ft. General contractors in this joint venture are Grove, Shepard, Wilson & Kruge of California, Inc., and Fred J. Early, Jr. Co., Inc., both of San Francisco. Steelwork is to be fabricated and erected by Bethlehem Pacific.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

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GAS—

Natural gas for the Pacific Northwest—Will it come from Southwestern or Canadian fields?

THE PACIFIC Coast continued to grow and prosper during 1953 and its utility companies did likewise. Gas companies of the eleven Western States now have about 3,500,000 customers, who in 1953 purchased close to 550 billion cu. ft. of gas and paid more than $300,000,000 for it.

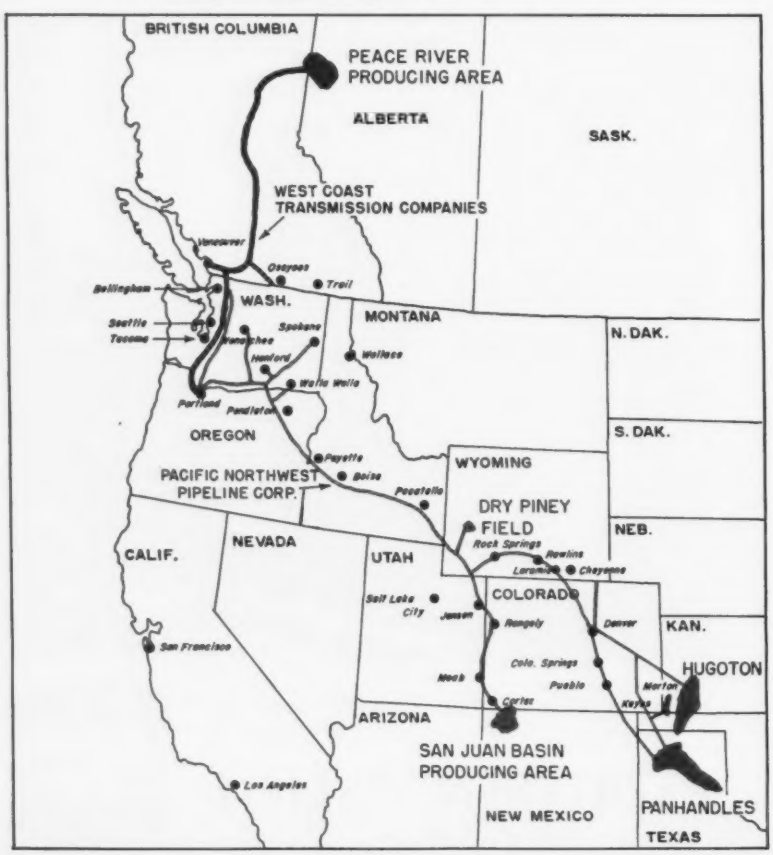
Number of customers during 1953 rose 5.4%, while gas rates went up 3% to 4%. The value of Western gas utilities has now risen above the $1 billion mark.

Growing pains

This rapid growth has brought many problems, particularly to California companies. Until 1946 all demands were supplied by natural gas from California sources. Early this year the state's capacity to deliver out-of-state gas will reach 1,405,000,000 cu. ft. per day, or close to 75% of the state's needs. At the present time, about 60% of the state's gas is being piped in from Texas. The percentage varies from 55% in the northern part of the state to 65% in Southern California. At the beginning of 1953 California utilities had capacity to receive 805,000,000 cu. ft. per day of out-of-state gas. By the end of 1953 they had a capacity in operation or under construction of 1,405,000,000 cu. ft. per day. These imports are the equivalent of 250,000 bbl. of oil a day, or one-quarter of California's oil production.

Some authorities predict a 40% increase in gas sales during the next five years. Others believe that by 1975 usage will be from two to three times that of 1950, due to growth of population, rapid commercial development and industrial expansion.

Competing Proposed Gas Lines



The Pacific Northwest is still the largest area in the United States without natural gas. The Federal Power Commission has conducted hearings throughout the year on applications to pipe natural gas to the Pacific Northwest, and a decision is hoped for early this year.

Decision as to who will supply the natural gas has been narrowed down to two pipelines: No. 1, from the Peace River producing area, located in northern Alberta, Canada, to be built by West Coast Transimission Co.; and No. 2, from the San Juan Basin producing area, in northern New Mexico, to be built by the Pacific Northwest Pipeline Corp.

The Pincher Creek producing area, located near the international boundary in Alberta, was competing at the beginning of the year but has now been forced out of the running. Although both Seattle Gas Co. and Portland Gas and Coke of Portland, the principal distributors of the proposed gas, had established tentative contracts for gas from that source, the Canadian Government refused to issue export licenses and permits.

This particular producing area, although the closest to the Pacific Northwest, will be developed to supply natural gas to Eastern Canada. The Canadians reasoned that the Peace River area should be the one to supply gas to the Pacific Northwest, as it was not feasible to build a pipeline connecting it to the eastern industrial areas of Canada.

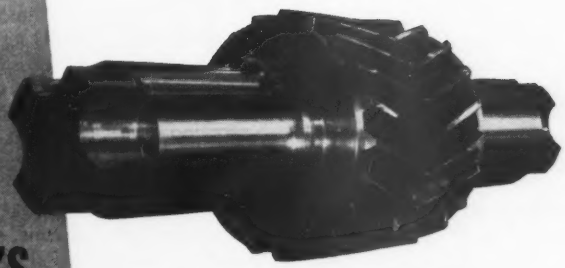
West Coast Transmission Co., which would be builder of the Peace River line, is favored by Portland Gas and Coke Co., which would distribute some 38% of the line's gas.

Bechtel report

Portland Gas and Coke engaged Bechtel Corp. to make an impartial and objective study of the relative costs of transporting natural gas by the two pipeline systems. Bechtel reported that the Canadian line has the following advantages: (1) There is a lower initial cost. (2) The line's capacity can be expanded to approximately 400,000,000 cu. ft. per day with a modest increase in capital cost. (3) It will have a lower operating cost. (4) It will be as reliable in operation as that of the Pacific Northwest Pipeline Corp. (5) The Pacific Northwest Pipeline Corp. cannot expand beyond a capacity of approximately 300,000,000 cu. ft. per day without large additional capital expenditures.

Furthermore, Bechtel believes that West Coast can transport gas to the market area at a cost of from 3.7¢ to 5.5¢ per 1,000 cu. ft. less than the

Steel products produced to your most exacting needs from NATIONAL SUPPLY'S "Workshop of the West"

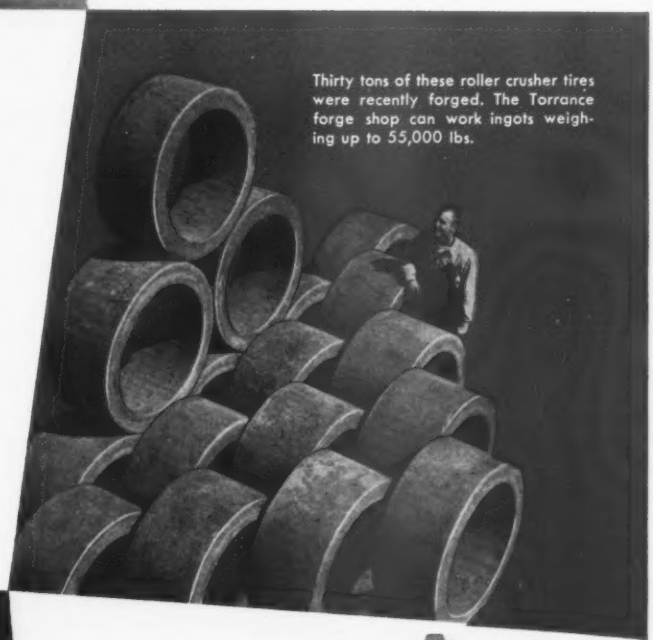


One of two 19,000 lb. pinions for a steel mill drive which were cast from special analysis steel, heat-treated and precision-machined.

These big jobs which required precision work are typical of daily operations at National Supply's Torrance plant—the largest completely integrated machinery manufacturing plant on the west coast.

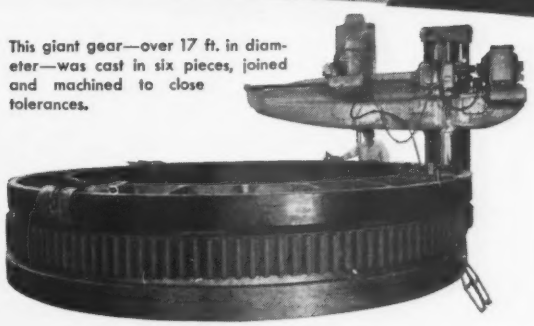
National's staff of skilled operators and technicians can readily produce such jobs to your most exacting needs because their steel processing facilities and methods are as modern as tomorrow. The Torrance machine shop, for example, is equipped with over 300 lathes, boring mills, presses, milling machines and many other types of machine tools. As a part of the fully integrated facilities in this "Workshop of the West," it's just another reason why you'll find it worthwhile to send your steel product jobs to National.

Why not visit Torrance and determine for yourself how National Supply's Industrial Products Division can help you?



Thirty tons of these roller crusher tires were recently forged. The Torrance forge shop can work ingots weighing up to 55,000 lbs.

One of four 38,000 lb. pump casings recently cast and machined for use in a Southwest water system.



This giant gear—over 17 ft. in diameter—was cast in six pieces, joined and machined to close tolerances.

INDUSTRIAL PRODUCTS DIVISION

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STEEL CASTINGS AND SPECIAL MACHINERY
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ASSEMBLING • WELDING • TESTING

Pacific Northwest Pipeline Corp. from the San Juan Basin.

The Canadian Government has issued a 22-year export license to replace the previously issued 1-year pact. Canadian producers have agreed to sell their gas at as low as 5¢ per mcf. at the outset in order to make their contribution to proper delivered price to distributors.

The West Coast Transmission line would extend southward from the Fort St. John field, the newest proven resource of the Peace River area, and follow highway routes practically all the way, some 960 mi. to Portland, Ore. Financing for the original estimate of $111,000,000 project is assured, $86,000,000 having been promised by insurance companies and banks, headed by Prudential Life. With increased drillings in the Fort St. John area, a very large reserve is now indicated. It has been estimated that the undeveloped gas reserves in this area are the greatest of any structures so far found in Western Canada.

San Juan Basin

Construction of the Pacific Northwest Pipeline Corp.'s line from the San Juan Basin is favored by Seattle Gas Co. Chief advantages claimed for this pipeline are: (1) Unquestioned and proven reserves with a real possibility of securing natural gas for a term of an additional 20 years or more after the termination of the first contract period. (2) A guarantee that the contracted cost of gas shall not be changed without sanction of the Federal Power Commission. (3) Assurance of continuous and adequate gas supply.

The Seattle Gas Co. maintains that "we are foreigners to Canada, and we, as an American public utility, are unwilling to become an economic vassal of a foreign power."

The Pacific Northwest Pipeline Corp.'s line, originally estimated to cost $138,000,000, would extend from the four corners area of New Mexico through Colorado, Utah, Idaho, Oregon and Washington, serving markets of both the Northwest and the Intermountain areas. San Juan Basin fields are 1,300 pipeline miles from the Seattle market, and the Wyoming reserves committed to the project are approximately 900 mi. from this market. The San Juan Basin has proven reserves in excess of 7 trillion cubic feet and is estimated to have in excess of 15 trillion cu. ft. when developed.

More facts

Whichever pipeline gets the contract to supply gas, the population of approximately 3,500,000 people will certainly benefit. Natural gas would help alleviate the critical power shortage by saving an average of 150,000 kw. and approximately 12,000,000 bbl. of oil per year.

West Coast Transmission Co.'s proposed pipeline is 600 mi. shorter than that proposed by the Pacific Northwest Pipeline Corp. The Canadian contract stipulates that not more than $4,000,000 worth of costs over and above the present estimate can be transferred on to the distributor and the user. On the other hand, an all-United States pipeline, under present rules, can transfer all of the costs of construction on to the distributor and user. Both companies plan to supply gas of 1,000 Btu's at approximately 35¢ per 1,000 cu. ft.

The price to the ultimate user is a crucial point in the Pacific Northwest, since 85% of its demand will compete with oil. Of this percentage, 51% is expected to displace heavy residuum oil in industrial loads and 34% will displace burner oil and space heating.

The presence of natural gas in the Northwest should attract industries who prefer closely controlled direct heat, providing greater industrial use of both gas and electricity.

Mountain States gas

A $20,000,000 expansion program was undertaken in 1953 for Colorado Interstate Gas Co., suppliers of natural gas to the Rocky Mountain area. The 1954 construction program hinges on the decision of the FPC as to which line will be built. If the Pacific Northwest pipeline from the San Juan fields is built, Colorado Interstate Gas Co. will seek FPC approval to build a pipeline tying in at a point near Rock Springs, Wyo., to service Denver, 365 pipeline miles away.

A compressor station would be built with a capacity of 5,500 hp. Cost of these proposed facilities would be around $23,000,000. This line would bring to four the number of CIG pipelines into Denver. The 365-mi. line of 22-in. pipe would be constructed so that it would deliver 100,000,000 cu. ft. of gas daily and ultimately be capable of handling 200,000,000 cu. ft.

During 1953 Colorado Interstate completed looping its line from the Kit Carson Compressor Station in eastern Colorado to Denver, constructed a compressor station at Springfield, Colo., and undertook additions to the facilities at three other company compressor stations.

Completion of the looping of the Kit Carson-Denver line increased the company's transmission lines to 952.8 mi. The compressor station facilities added under the 1953 construction program brought the company's total horsepower to 93,840.

At the time the 1953 construction program was undertaken, Colorado Interstate was capable of delivering 429,000,000 cu. ft. of gas daily to customers in the Rocky Mountain area. Completion of the facilities of the 1953 program will boost that total to 512,000,000 cu. ft. daily. And if the FPC approves the proposed Rock Springs to Denver line, the company will be capable of 630,000,000 cu. ft. daily.

COAL

Industry is hopeful for renewed demand over the long pull despite today's troubles

WHILE NATURAL GAS is invading the industrial markets of Western coal, and threatens to intensify that invasion during the next few years, coal industry leaders in Utah are mildly optimistic about the future.

The 1953 production in Utah was approximately 6,000,000 tons, the same as 1952 and about 1,250,000 tons under the peak production reached immediately after World War II, when there was a large export business. Wyoming production is also running about the same as last year.

B. P. Manley, executive secretary of the Utah Coal Operators Association and a longtime student of the industry, thinks coal will hold its own during the next few years and thereafter enter another expansion era.

He is more optimistic about the long range outlook for the industry than for the short range, because he thinks industrial expansion will absorb much of the firm supply of natural gas that might be available for heating during the near future. Gas from the recently discovered Clear Creek field in Utah, which is already being brought into the Salt Lake area, will displace about 250,000 tons of coal. Outlook is that the gas supply will be substantially increased.

One coal market that is increasing is electric power generation. Steam plants are being built in California and the Pacific Northwest to firm up the hydroelectric supply, and this market is likely to continue to increase. Because much of this steam plant capacity is for firming purposes, natural gas may not be used inasmuch as it is generally available only on an interruptible or surplus basis.

In the Rocky Mountain states, strip mines are doing well, but others report business poor.

LIQUEFIED PETROLEUM GAS

Propane powered locomotive pulls for Union Pacific. Standby fuel installations increase

BIG NEWS in industrial uses for liquefied petroleum gases during 1953 was the placing of a propane turbine operated locomotive on the Los Angeles to Las Vegas division of Union Pacific for an operating test. Developing 4,800 hp. and pulling a 79-car freight train, this engine consumes nearly 15,000 gal. of propane per round trip.

LPG fuel is predominantly propane in the California area, with butane in demand for chemical conversion and gasoline refining. In the Northwest, where these demands are lacking, butane is available at lower Btu. cost than propane. Washington Brick Co., Spokane, fires automatic continuous kiln and several beehive type kilns with butane, displacing coal in the latter.

Industrial standby fuel installations continue to be made. Producers are reluctant to supply these unless users agree to balanced consumption program throughout the year. Reason—peak standby demand coincides with highest consumer demand for domestic heating fuel, which consumes normal current production. Summer demand is badly needed, as major storage facilities for reserves are not available.

Considerable use of LPG is being made in dehydration or other heat processing of minerals such as Perlite and agricultural products—rice, cotton, alfalfa meal, dehydrated fruit—where clean combustion is essential to take advantage of efficiency of "direct firing," and where contamination with combustion products or unburned fuel would depreciate product.

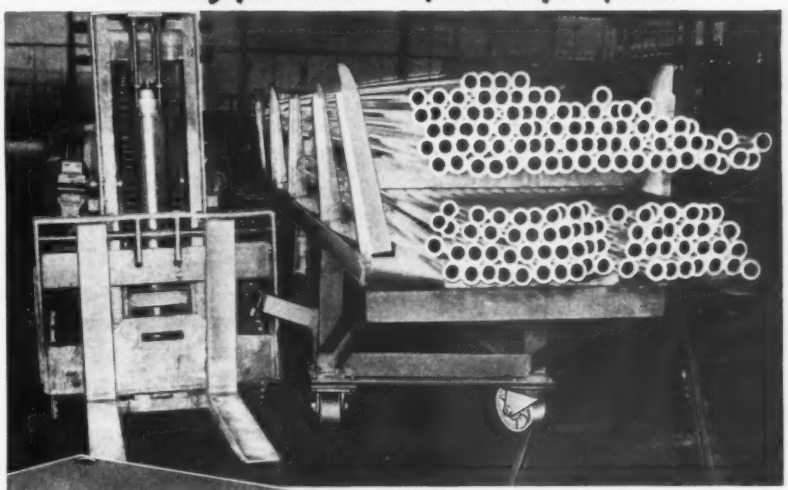
An interesting use probably due for further expansion is production of "inert atmosphere" by burning oxygen out of air in balanced air-fuel mixture. This is being used to prevent dust explosions in fertilizer plants and is applicable to sulphur milling and other operations involving fire or explosion hazards in normal atmosphere. Inert atmosphere is also useful in bulk storage of food products subject to deterioration through oxidation, in preservation of vitamin values in stock feeds such as ground alfalfa, etc.

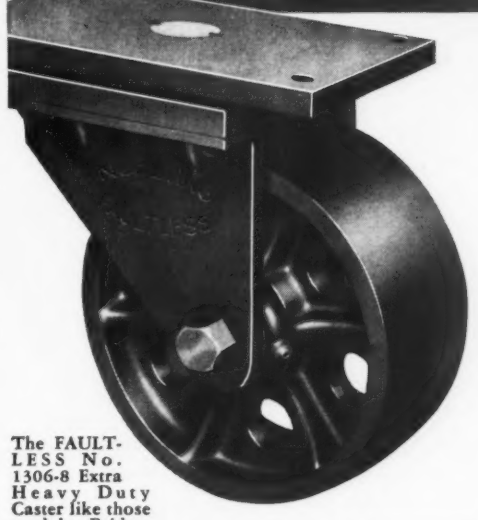
In cutting steel, propane is said to make cleaner cuts than acetylene, almost as fast, with less cleanup time required on work pieces, and at lower fuel cost. It is not applicable to welding of steel.

Faultless FACTS

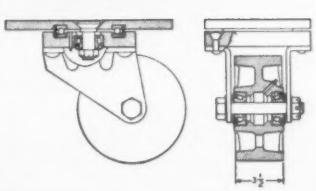
BREAKDOWNS ELIMINATED ON TRANSFER CAR

at Bridgeport Brass Co., Indianapolis, Ind.





The FAULTLESS No. 1306-8 Extra Heavy Duty Caster like those used by Bridgeport Brass, Indianapolis, Indiana, on their heavily loaded transfer car. Precision built, deeply corrugated for extra strength, moves loads up to 7½ tons per caster.



The Indianapolis Mill of Bridgeport Brass produces brass and copper mill products in the form of sheet, rod, wire, and tubing. Materials handling at Bridgeport, as in other industries, is always of major concern. Rough concrete floors and steel tracks were a rugged test for truck casters. The intolerable costs encountered when casters under the transfer car frequently broke down necessitated an immediate solution to the problem. After trying many different kinds, engineers at Bridgeport found FAULTLESS stood up on the job. The choice of FAULTLESS Engineered Casters by the Bridgeport Engineering Department, eliminated a costly production "bottle-neck." Now, more than five tons of brass and copper tube are moved 50 to 60 times on FAULTLESS Casters each day at Bridgeport Brass Company. If you too have a tough caster problem, a Faultless Sales-Engineer will gladly help you choose the right Caster for your needs, or write us for catalog specifications, no obligation.

FAULTLESS CASTER CORPORATION

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FAULTLESS SOLVES THE TOUGH JOBS

GAS APPLIANCES—

Coast manufacturers enjoyed second largest sales in their history and 1954 is promising

PACIFIC COAST gas appliance manufacturers enjoyed good business during 1953 with estimated gross sales of well over $100,000,000. This, if not equal in total volume to the biggest year, 1950, is close to it and may be better in net profit. The continued housing boom has helped appliance manufacturers to maintain production at a high rate. Last year was a better appliance year than 1952 by about 15%. It is expected that present rates of production can be maintained in the early months of 1954.

After that, the trend will be influenced by new housing starts and the success of gas companies, manufacturers and dealers in carrying through promotions to reach the tremendous replacement market.

Although the industry's annual construction and expansion bill is large, trends indicate a decrease in dominance of the domestic cooking field.

The Pacific Coast Gas Association reports the following figures, from 14 West Coast firms, for 1953 gas appliance manufactures. A large number of the gas appliances manufactured in California are for markets in the Middle West, South and East.

Appliances	No. of units in thousands 1952	1953
Water heaters	714	760
Floor furnaces	75	62
Recessed vented wall heaters	192	275
Central furnaces	73	85
Vented circulating heaters	8	15

Estimated appliance sales in units

(Northern California, by P. G. & E. Co.)

	Estimated 1954	Actual* 1953
GAS		
Central furnaces	12,900	13,990
Floor furnaces	9,020	9,480
Clothes dryers	7,250	5,530
Ranges	48,000	45,670
Refrigerators	1,740	1,635
Room type heaters	10,120	12,240
Wall heaters	21,500	20,620
Water heaters	55,800	58,110
Total	166,330	167,275
ELECTRIC		
Freezers	21,500	18,340
Ironers	7,050	6,830
Clothes dryers	20,000	16,940
Ranges	19,000	18,500
Refrigerators	65,000	68,410
Room coolers		
Evaporative	10,680	9,060
Compressor	2,470	1,400
Television	140,000	142,000
Washing machines		
Automatic	63,500	62,600
Non-automatic	26,500	26,440
Water heaters	6,300	5,660
Total	382,000	376,180

*Eight months actual, four months estimated.

OIL HEATING—

Oil-fired central heating equipment Factory shipments to the 11 Western States

Compiled by Oil Heat Institute of America, Inc.
(Does not include space heaters or portable oil-fired heaters)

	Domestic conversion	Furnace units	Boiler units	Water heaters
January to June 1953	5,714	10,029	880	776
Estimated 1953 total	12,728	22,309	1,976	1,749
1952 total	38,349	12,283	4,525	6,009

ELECTRICAL APPLIANCES—

Household refrigerators lead the field in appliance sales

THE FOLLOWING figures represent Western sales of electrical appliances for the first 9 months of 1953, as reported by the National Electrical Manufacturers Association.

Type of appliance	Total sales, 11 Western states
Electric farm and home freezers	47,932
Electric ranges	119,001
Electric household refrigerators	306,130
Electric storage water heaters	35,637

AIR CONDITIONING—

Warm air registers popular in 1953 and demand is promising

DESIGN and manufacture of special warm air registers for use in perimeter heating systems began in 1953 and have proved satisfactory for small homes. Demand for perimeter registers has been increasing steadily and is expected to continue in 1954.

The use of directional air flow registers became popular when forced air heating developed some years ago, and general summer cooling, which promises to develop rapidly in the next few years, will make high-grade registers a necessity. Demand will be for better-made registers which will accurately furnish directional flow air registers.

Most manufacturers making a full line of air conditioning products are well equipped with engineers and production machinery to meet demand.

INSULATION BOARD—

Another good year is forecast for the industry with Western sales passing 200,000,000 sq. ft.

ANOTHER good year for insulation board sales in the Western States, as well as throughout the United States, is predicted by the Insulation Board Institute, who said sales in the 11 Western States (as of the last full-year report, 1952) run well over 200,000,000 square feet annually.

1954 predictions on the basis of a continued high volume of building indicate that several new products introduced by insulation board manufacturers are gaining in popularity, and a new flame-resistant coating being added to decorative insulation board products for interior finish use by all companies of the Institute will make the products more popular.

A new roof deck slab developed for warmer climate areas is finding a ready market in the South and Southwestern states.

Another new product gaining nationwide popularity is a shingle backer material, similar in substance to insulation board sheathing and wallboard, which provides an insulating undercourse for wood or asbestos-cement shingle siding.

The new flame-resistant coating is expected to increase the popularity of decorative insulation board tile and plank. These products are ideal for the do-it-yourself market, which gives every indication of continuing for at least another five years.

Insulation board sheathing, in both rural and urban areas, continues to be a big selling item. Farmers, becoming more aware of the need for insulated buildings for livestock and poultry, are using many types of insulation board products, particularly sheathing and building board.

Sheathing is also a big volume material in new home construction increasing in popularity within the past few years. Tests have established its bracing strength when used in large panels, vertically applied, and all model building codes sponsored by building officials organizations, and many other codes, now accept its use.

LOOK UP HERE

FOR EXTRA FLOOR SPACE...

The "SAVE-WAY" to move Materials is the *Ceiling Way!*

MANY plants are crying for extra floor area, yet not using half of their cubic footage. Except for piping, wiring and air circulation, the upper ceiling space is largely wasted.

The more activity that can be transferred to this overhead space, the more floor area will there be for other purposes. This permits adding more production tools without plant expansion, storing more materials, removal of floor confusion, increasing output and other advantages.

Materials handling is an activity that can be done very efficiently overhead. That is one reason why Cleveland Tramrail equipment is so popular. Not only does it serve well without using valuable floor space, but it speeds handling, greatly lowers cost and is a great aid to safety.

A Cleveland Tramrail engineer will be glad to discuss with you the "Save-Way" of moving materials, without obligation.

Investigate the Possibilities of

CLEVELAND TRAMRAIL

... the Overhead Track to

Lower Production Costs

Let us mail you this booklet. Packed with helpful data. Ask for No. 2008.

This large book is the greatest in its field. Contains a wealth of valuable information. Covers details of 91 outstanding installations. Has 252 large photos, 38 system layouts, 59 other sketches. Write for "Cleveland Tramrail at Work." A nearby representative will deliver it without obligation.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
1045 EAST 289th ST. WICKLIFFE, OHIO

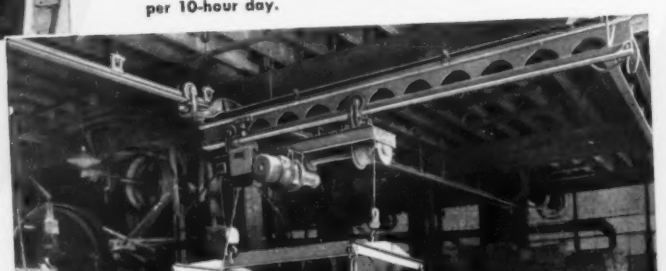
Are YOU paying for Overhead Handling *Without having it?*

Hundreds of plants are in effect making sizeable payments on materials handling equipment every month without getting it. The payments are the extra costs incurred through inefficient handling losses. Have a Cleveland Tramrail engineer study your plant handling. Make sure you are not dissipating profits on outmoded ways of handling.

Savings Like these Can Be Yours!

Lumber Crane Pays for Itself in 13 Weeks

In just 13 weeks the entire cost of the one-ton hand-propelled crane, illustrated below, with electric hoist, crane runway and erection was absorbed because of the efficiency introduced in handling lumber the overhead way. 10,000 feet are handled per 10-hour day.



Foundry Jumps from 3 Heats to 8 Daily

With no increase in man-power, the installation of an inexpensive Cleveland Tramrail hand-propelled system in a small brass foundry made a terrific difference in its operations. It made possible 8 heats a day where formerly 3 was the average. Despite more than double output, the men are less fatigued now at the end of a day.

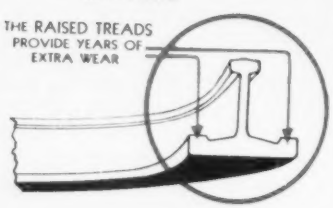
Your CLEVELAND TRAMRAIL *Distributor*

is the Right Man to Know

Cleveland Tramrail distributors are engineering organizations ready to provide counsel on materials handling problems and carry through on all details to erection and operation. Because of their extensive experience you can be sure of getting the best solution to your problem.

There is a nearby Cleveland Tramrail distributor who will be glad to assist you.

ONLY CLEVELAND TRAMRAIL PROVIDES FLEXIBLE SUSPENSION



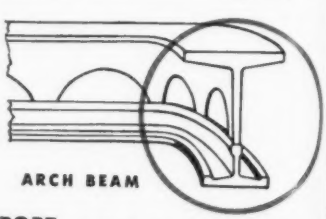
Cleveland Tramrail is the only manufacturer of the full-floating, strain-relieving, flexible-suspension method of track support.

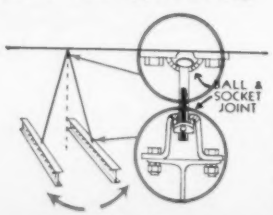
Rail or arch beam is held in position by hanger rods that are attached to the overhead structure. Both ends of the rods have ball and socket connections which provide flexible support and eliminate strains caused by swinging loads.

This outstanding feature is a tremendous factor in securing a smooth-running low-maintenance system.

THE RAIL —Tramrail rail is used for loads up to 3 tons where sufficient supports are easily provided.

ARCH BEAM —Seven sizes of arch beam are available for heavier loads or service and where spans between supports are long.





FLEXIBLE SUPPORT —Swinging loads set up high strains in overhead handling systems rigidly secured to the supporting structure and friction is increased and carrier operation retarded by uneven loading of the wheels. This condition is far worse on curves. These disadvantages are eliminated by Cleveland Tramrail flexible ball and socket supports, resulting in unusually smooth, easy operation.

CLEVELAND TRAMRAIL DIVISION The CLEVELAND CRANE & ENGINEERING CO., Wickliffe, Ohio

COOLING TOWERS—

Redwood still favorite for construction, but steel, asbestos cement board, masonry grow

APPLICATION of industrial cooling towers varies in almost direct ratio to total plant investment, regardless of the climatic conditions in the plant vicinity.

The trend in production methods for industrial towers has been towards more prefabrication in the shop, and consequently less field labor on installation. More fabrication facilities have been installed in California in recent years because of savings in freight costs resulting from drying lumber prior to shipment.

Approximately $3,500,000 worth of additional plant facilities have been added to the fabricating plants of the major producers in California within the last five years. These plants are located at Arcata, Healdsburg, Santa Rosa, Stockton, Merced and Los Angeles.

Equipment trends show an inclination toward the use of the mechanical type induced draft tower. Within the last 15 years the mechanical draft tower has virtually displaced the use of the atmospheric type tower in industrial applications.

Although California redwood lumber remains the favorite material for construction, the gradual enactment of fire zone ordinances and effective efforts of architects to improve the appearance of industrial equipment have brought an increasing use of masonry, asbestos cement board, concrete, steel and aluminum.

New designs include hydraulic motor drives for cooling tower fans, thermostatically controlled adjustable pitch propeller type fans, and high fan discharge stacks which effect discharge of the saturated vapors from the tower at elevated levels up to as high as 120 ft. above grade.

The past five years have seen an expansion of the market served by water conservation equipment in direct proportion to the increase in industrial and commercial construction.

The Cooling Tower Institute, whose headquarters are in Palo Alto, Calif., predicts that the installation of water conservation equipment will continue its upward trend probably at an accelerated rate as more municipal, county and state water utilization regulations are developed and enforced. Although adequate water supplies exist in many cases, the cost of developing these for commercial and industrial use is often beyond economic justification.

The following figures are supplied by the Cooling Tower Institute.

Industrial cooling towers

Year	Total sales value in thousands	Board footage of redwood in thousands
1952	$3,600	7,000
1953	3,900	7,500

Water conservation effected

Year	Gal./day recirculated in millions	Gal./day conserved over single usage in millions	Equiv. to domestic requirements (persons) in thousands
1952	1,340	1,273	1,211
1953 (est.)	1,420	1,349	1,282

BOILERS—

BOILER shipments for 1953 ran well ahead of 1952, resulting in the largest volume of shipments in the industry's history.

The principal trend among hot water and steam heating systems is the increased popularity of baseboard type of radiation, and the installation of floor and ceiling panel heating systems. The past year has also shown an increase in the trend toward forced hot water heating systems and a considerable increase in the number of gas fired units.

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RIchmond 6221
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AIRCRAFT—

Major Western emphasis on titanium alloys, new adhesives, ceramic coatings, rubber forming

DURING the past years each of the major aircraft manufacturers has vigorously engaged in a program of increased development and experimentation calculated to make airplanes fly higher and faster and carry more payload, weapons and equipment.

WESTERN INDUSTRY has completed a special survey of the aircraft manufacturers of the West in an effort to find out the primary trends of the industry as well as the new materials, applications, processes developed during the last year.

From a careful review of the programs of these major manufacturers, it may be concluded that the following primary trends are becoming evident:

1. Considerable experimentation and developmental work on the adaptation of titanium and its alloys to jet aircraft.

2. Continued development of ceramic coatings to protect against the terrific heat found in jet and rocket aircraft.

3. The use of high pressures, between 5,000 and 10,000 psi., for impact drop hammer rubber forming of sheet metal parts. Advantages are high psi. pressure at the instant of impact and very good definition of joggles, recesses and flanges.

4. Honeycomb structures with fiber and metal for use as door panels, bulkheads, etc.

5. Increased use of heavy gauge machines or extruded integrally stiffened structural members such as sculptured skins.

6. Greater use of adhesives and plastics to replace rivet structures and critical materials.

7. Greater trend to replace bits-and-pieces type of construction with large forgings.

8. Increased use of forming methods, involving a combination of welding and subsequent forming by internal fluid pressure or expanding mandril type equipment. Increased development of metal bonding equipment with fusion and resistance welding gaining in importance.

9. Methods to improve the heat-treating properties of alloy steels. Through use of new methods, manufacturers have been able to raise the heat-treat levels from 200,000-220,000 psi. to 260,000-280,000 psi.

WESTERN INDUSTRY's survey indicates that the manufacturers of aircraft and the manufacturers of aircraft components are intensely concerned with the highly diversified research and development programs geared to the aircraft of the future.

The following results, by individual manufacturers, indicate what is new in materials, methods and equipment in the last year, as well as utilization of already known materials and processes. They were compiled from replies to WESTERN INDUSTRY's survey.

Components the West should build

(suggested by several companies)

BOEING. Among items now purchased in the East, Boeing would like to see the West build internal fuel cells, landing gear, armament, etc.—providing costs are comparable.

CONSOLIDATED VULTEE would like to see forgings of large sections and extrusions of large flat integrally stiffened skins manufactured on the Pacific Coast.

HUGHES. Securing of electronic components from the West is becoming much easier, but not all kinds of power and receiver tubes are available. Many other components are produced in small quantities but do not always meet the quality of Eastern made parts. In electronic components a general broadening of the base seems advisable, with larger manufacturers, able to buy the costly test equipment needed to insure quality products.

RYAN. Among those components currently being bought in the East, Ryan would like to obtain the following on the Pacific Coast: large diameter (24 to 40 in.) flash-butt welded stainless steel rings, special mill shapes of stainless steels, and temperature and pressure resistant seals (chevron, etc.).

Boeing

One of Boeing's developments during the past year has been the technique, tools and equipment to bend large-diameter thin-wall stainless steel tubing to radii only twice the tube diameter. Also developed is a method of impact high-pressure rubber forming, using a trapped rubber head on a drop hammer. This method is especially valuable for hot forming.

New plastic materials with improved characteristics which permit their use for tools such as joggle dies have been developed, as have helical formed carbide inserts for cutting tools. The latter have doubled the amount of material removed and greatly improved the finish on the part.

Some of the new equipment contributing to Boeing's operation includes: greatly improved automatic riveting equipment which will position the work, drill, countersink, insert and drive the rivets. Such equipment drastically reduces riveting costs. Larger and more flexible stretch-forming equipment has been installed for both section and skin forming. However, this equipment still requires a fair amount of operator skill to produce uniform parts.

The increased use of magnesium and titanium has forced the industry to develop means for heating forming tools used on these materials. As yet the ideal heat media, equipment and types of tools have not been determined.

Due to heavy skin gauges and the need for doing close tolerance holes, there has been a large increase in the use of portable automatic drilling, reaming and countersinking equipment. Most of this equipment is not entirely satisfactory, being too bulky and heavy, and requiring a great deal of servicing.

Consolidated Vultee

Use of 40 deg. helical milling cutters is receiving strong favor from machine shop supervision at Convair. These cutters result in better finishes, faster feeds and speeds, longer spindle life and all-around improved efficiency.

Hydraulic tracing mechanisms are being installed on milling machines and turret lathes, providing a substantial increase in accuracy and production.

A special hydraulic beading machine was recently constructed to expand reinforcing beads in thin wall ducts and other similar items. Advantages of this machine are speed, accuracy of form and a structurally improved product.

Durasheath: for lower-cost power distribution

DURASHEATH* is a light, tough cable. It is easily installed and thoroughly dependable for series or multiple street lighting, traffic control, and airport† lighting, residential primaries and secondaries as well as for industrial plants and railroads. It may also be used as Type USE cable for underground service entrance.

DURASHEATH cable can save you money. You can run this flexible, easily handled cable underground (buried directly in the earth), overhead or in ducts (or in any combination of these) without needless, time-consuming jointing. Its light weight and flexibility make duct pulling fast even in zero weather. Aerial assemblies go faster. Linemen like to work with it.

* * *

As one of several types of ANACONDA power cables, DURASHEATH is available in all sizes, single or multiconductor, copper or aluminum, from 600 to 15,000 volts. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

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Primary and secondary distribution cables • building, machine tool, control and communication wire • portable cords and cables • bus-drop cables • apparatus cables • copper, aluminum, copperweld conductors • wire and cable accessories.

†*when ordered to CAA Specifications L-824*

ANACONDA ON THE PACIFIC COAST: Plant at: Orange, Calif. District Offices at: Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash.

AIRCRAFT— . . . Begins on page 70

Where military specifications permit, processing departments are gradually increasing the use of Alodine protective finishes for aluminum instead of Electro-Anodize finishes.

The recent installation of a copper brazing furnace with forced convection controlled atmosphere provides Convair with an excellent facility for accomplishing its own copper brazing, eliminating delay due to transportation to subcontractors and providing better control of the product, as well as improved quality and economy in fabrication.

Sub-assembly department layouts are being rearranged for "proximity stock," which provides storage of all available parts adjacent to or within the usage point of sub-assembly fabrication. Proximity stock has produced lower handling costs, reduced shortages and improved the feeling of responsibility of personnel fabricating sub-assemblies.

High-pressure rubber forming utilizing hydraulic equipment is being used more continually. The Verson-Wheelon press of special design for high-pressure rubber forming has a number of advantages in that it provides good formability, speed of operation, minimum use of floor space and low cost of equipment. However, improvements are needed in the design and construction of the rubber components and table of the machine in order to reduce breakdowns.

Another form of high-pressure rubber forming is Convair's "Hi-Draw," Martin Aircraft Co.'s "Marform" and Cincinnati Milling Machine Co.'s "Hydro-Form." These three processes are nearly identical in principle but differ somewhat in detailed design and application. In general, a die with a blank holder is on the lower platen with a rubber padded upper die which actually forms the parts.

Advantages of this process are the low cost of tools, speed of operation, ease of set-up, excellence of performance and high quality of work accomplished with a "metal flow" principle of fabrication. One of its disadvantages is the high cost of installation.

A new type of equipment used is the Huck hydraulic pull gun and power generator for the installation of Huck lock bolts. Offset and parallel pull guns permit the installation of larger diameter fastener with greater speed in more inaccessible locations than does the pneumatic type previously used. For high-speed aircraft with increased wing loading and thinner sections, an even smaller pull gun than those now available could be used to advantage.

Wedgelock nut plate punch and riveter units are also new items used at Convair during the past year. The nut plate punch pierces both rivet

The aircraft manufacturer speaks . . .

Parts or components needed that no one seems able to produce.

AiRESEARCH

Small precision steel castings that meet high standards of quality. These standards are not met at present.

BOEING

1. Precision forgings of all sizes which require a minimum of machining of attach points.
2. A silent method of driving large rivets and similar fasteners to reduce factory noise levels.

CONSOLIDATED VULTEE

1. Aircraft quality steel castings.
2. Better non-ferrous metal castings, especially aluminum and magnesium.
3. Open die forgings displaying greater smith skill in shaping to minimize machining costs.
4. A satisfactory method or process of providing definite compound contours on sculptured skins and on integrally stiffened skins.

DOUGLAS

1. A good coating for aluminum that will prevent corrosion from exhaust gases.
2. A good coating for magnesium that will prevent corrosion of floor components in buffet and toilet areas.
3. An adhesive or sealant usable to 600 deg. F. or 800 deg. F. without appreciable change in chemical structure or loss of strength properties.
4. A metal bonding agent which can be applied at temperatures not exceeding 275 deg. F., and also capable of maintaining a structurally sound bond at minus 100 deg. F.

HUGHES

Practically all items are produced on the Coast but are not of quality desired.

LOCKHEED

1. Investigation of methods for the production of sound steel castings by any casting method.
2. Large thin section light alloy castings.
3. Development of a weldable titanium alloy.
4. Development of Ti fasteners (bolt, etc.) with satisfactory properties.

MARQUARDT

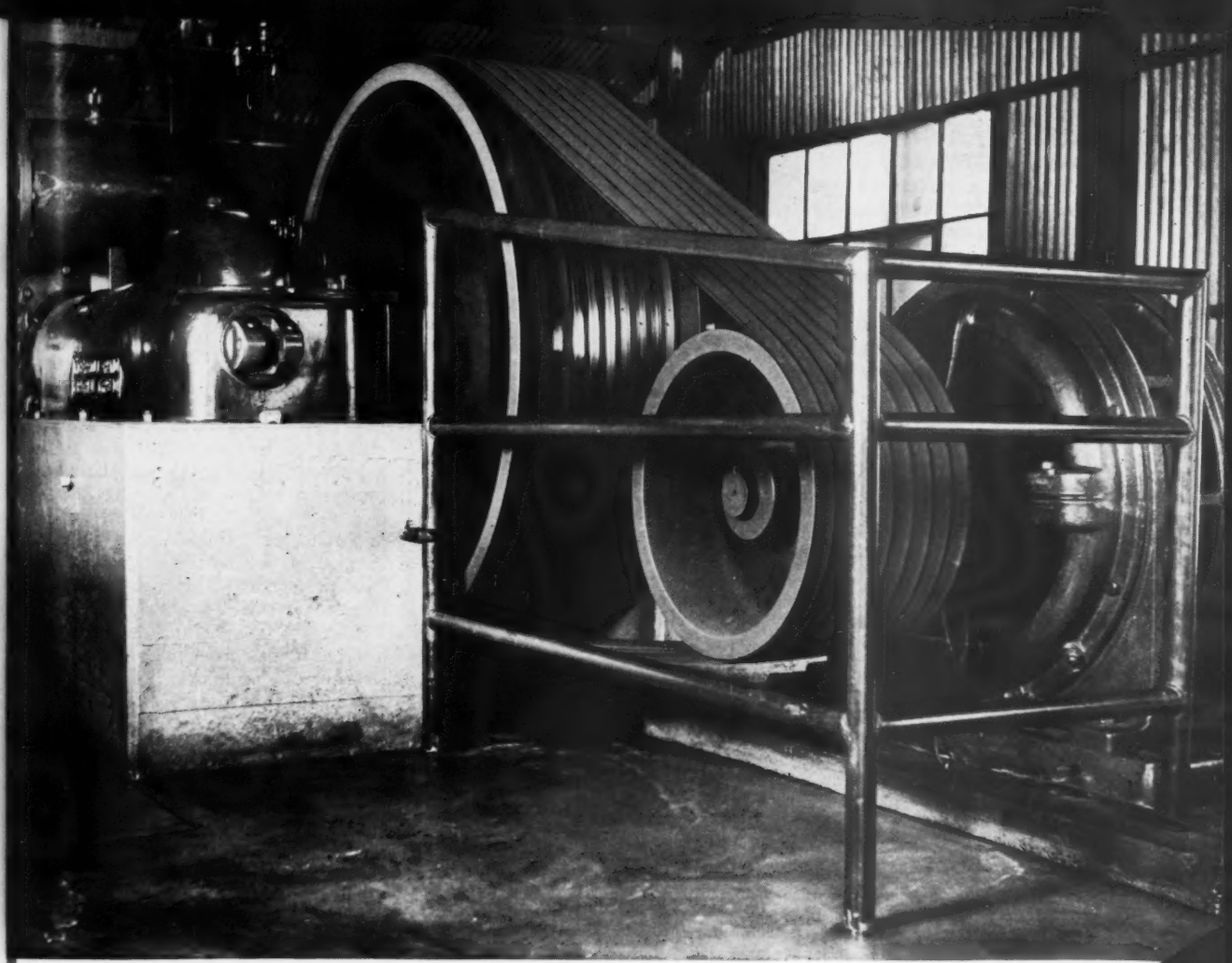
1. Sheet metal circular shapes with compound contours. These parts require the use of heat-treatable aluminum, magnesium and ferrous alloys without weld seams where fabrication or strength is a problem. The accuracy is in the order of plus-minus .005 on diameters up to 40 in. Metal gauges up to 5/16 in. in heat-treatable aluminum alloys, 3/16 in. in high temperature steel alloys.
2. Parts involving crush form grinding with less cost and lead time.
3. Sources of high-speed steel and carbide reamers, deep-hole drills, particularly for small diameters.
4. Turbine blade shapes for small quantity runs in lots of 10 to 100. Shape turning with equipment such as the British H. E. B. type shape-turning equipment.

NORTHROP

1. High temperature resistant bonded assemblies, including brazed steel and titanium honeycomb assemblies.
2. High strength flush blind fasteners that are fuel-tight.
3. Large diameter thin-wall tubing and the manufacturing techniques necessary to bend to very short radii.
4. Jet aircraft accessories capable of operating in the heat range of from 300 to 400 deg. F., and higher at a later date. As an example, hydraulic pumps.

RYAN

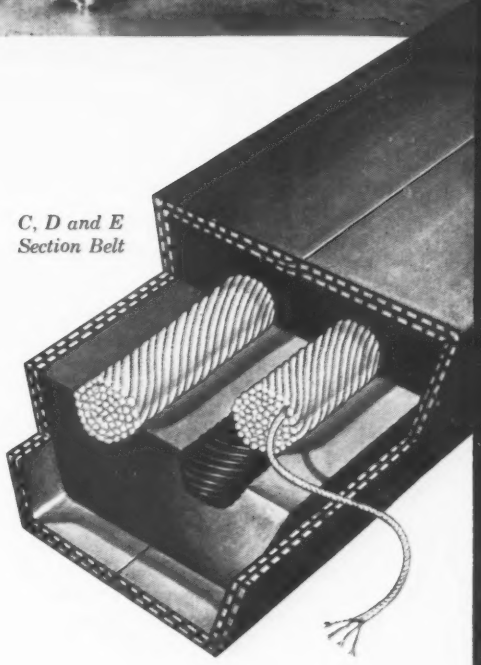
1. Stainless steel extrusions.
2. Cored forgings.
3. High temperature brazing material which can be applied with conventional production brazing techniques.
4. Temperature and pressure resisting plastics.
5. No-draft forgings.



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every plant application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. Call your Thermoid Distributor or write direct for Catalog #3787.



C, D and E Section Belt

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N. J. Nephi, Utah

holes for standard nut plates and the riveter upsets the shanks of both rivets to a set head height at one time. One of these units has cut time of installing nut plates by 55%.

The Hanna autoset riveter is a new type of compression riveter which has been ordered. This machine incorporates a sheet gap closing ram and an automatic head height compensation feature which enables its use on any rivet from 3/32 in. up to and including 3/16 in. diameter aluminum alloy rivets without change of rivet sets or gap. It will automatically upset the shank of the rivet to the proper head height if right grip length rivet is installed in the work. This principle applied to a stationary riveter would be very desirable.

During the past year, a number of new materials have come to the attention of Convair engineers. Weldable titanium alloys with aluminum as the principal alloying element have an additional advantage of improved resistance to elevated temperature effects. Since these materials are just emerging from mill development, procurement for evaluation is currently an obstacle.

Constructional alloy steels capable of being heat-treated satisfactorily in the 200,000 to 300,000 psi. strength range are also just entering the field. Since they are in early stages of development and proprietary in nature, they are sold in a small and limited field.

Aluminum alloys with greater strength than the 75S-T6 alloy have been advanced also. Clarification of their resistance to stress corrosion effects, by way of service evaluation, appears necessary to obtain wide acceptance of these materials.

Currently being developed are improved heat treatable electric arc welding electrodes capable of heat treatment to strength ranges upwards of 200,000 lb. Heat treatments for 4340 steel to permit its use up to 200,000 psi. are improving, the major obstacles being increased measures and service evaluation.

Douglas

Silicone elastomers are being used for gaskets, diaphragms, boots, door and canopy seals. Their principal attributes are complete flexibility from minus 100 deg. F. to plus 500 deg. F., excellent resistance to sunlight, ozone and ultraviolet light. They are, however, susceptible to volumetric increases when exposed to certain hydrocarbon fluids such as aromatic fuel and hydraulic oils.

The use of adhesives for bonding metal to metal and non-metallic parts together has been a major development at Douglas and offers considerable interest to the design engineer and fabricator. Advantages to be gained are large bond areas, elimination of drilled and dimpled holes, weight saving and smooth appearance of parts so joined. Their defects are age deterioration and the inability to thoroughly inspect them.

A development of new phenolic, epoxy and silicone resins offers the designer the use of fiberglas laminates in the 500 to 600 deg. F. temperature field. These offer weight-saving abilities for use in parts normally requiring the use of stainless steel. Many problems of cracking regarding stainless steel are avoided. Defects to be considered are moisture absorption after exposure to elevated temperatures and resultant low flexural strength, gradual deterioration of the resins due to aging or exposure, and pin-hole porosity when made by low-pressure methods.

Honeycombs

The use of honeycomb materials has been another major development in the aircraft industry for use as door panels, bulkheads, navigator and radio operator tables. They are being made from a paper and phenolic proprietary material called Aircomb. Honeycomb structures provide great rigidity and strength and have low weight factors. Their principal defects apply to restricted use outside the minus 65 deg. F. to plus 250 deg. F. temperature range, and ineffectiveness of bonds between the closure skins and the honeycomb core. The same inspection difficulties as noted under adhesives apply to these materials.

Thermosetting cast transparent laminated plastic sheet for use as cockpit and canopy enclosure materials has been a prime development, and offers advantages over the acrylic materials heretofore used. It is particularly resistant to crazing and solvent attack and has temperature stability at 200 deg. F., notch sensitivity, optical clarity and impact resistance. However, great care must be taken during all phases of production processes with respect to cutouts, joggles, holes and edge attachments.

The development and design of aircraft radomes with respect to both operational quality and variety in size has progressed rapidly during the past year. Problems of location, material, de-icing, electronic transmission, nonmetallic attachment, scope, weight and size are encompassed in each application. The development of suitable rain erosion protection has progressed, but not rapidly enough to satisfy the requirements of sonic and supersonic aircraft.

Insulation blankets

Insulation blankets must perform several purposes, those of keeping noise levels to a minimum and giving adequate thermal protection, and must also be the lightest weight possible. New developments in the field of super-fine quartz and silica fibers have been made and will soon be available for use in high temperature and acoustical blankets offering thermal protection up to and including 2,000 deg. F. or higher. This is extremely important in protecting structural components around the jet engine exhaust systems and other high temperature components.

There is considerable need and interest in the development of high strength casting alloys, both ferrous and non-ferrous fields. Casting design allowables are at the present time very conservative. Until improvements are made in casting techniques, purity of base metals, and high quality control methods established for production lots, the desired requirements will not be achieved.

The Douglas Long Beach Division has initiated a program for the use of 356-T6 centrifugal castings, wherein very close tolerances and fine surface finishes have been achieved, thus enabling the elimination of many machining operations otherwise necessary. The use of shell mold process, investment method and centrifugal process are all steps in the casting improvement program.

The development of thin-wall corrosion resistant steel tubing was necessitated by the use of pneumatic systems in turbo prop and jet aircraft. Tubing with wall thicknesses of .016 minimum and outside diameters ranging from 1½ to 7 in. are currently being used at temperatures of 700 deg. F. and under operating pressures of 200 psi.

Another major factor has been the development of machined and roll tapered bare and thin-clad aluminum alloy skin panels. New facilities installed at the aluminum mill levels have enabled the airframe manufacturer to procure quality sheets and plates exceeding 100 in. in width and up to 30 and 40 ft. in length.

Development by the Air Force of large forging facilities and the installation of related equipment offers considerable interest to the airframe designer. However, little use is being made of such facilities by Douglas

until production programs can justify the development costs involved.

Installation of large extrusion presses ranging from 8,000 to 20,000 tons, with the necessary additional facilities, such as heat-treating and quenching tanks, stretch presses, etc., are being utilized in the fabrication of large wing spar members. These new presses are capable of producing sections up to 36 in. wide and 90 ft. long and the potential producibility of previously unavailable irregular shapes and integrally stiffened wing panels is now available to the designer.

Development work

In addition to the foregoing items, Douglas is doing considerable developmental work on the following: fusion welding, fatigue testing, oils, greases and lubricants, improved aluminum finishes, improved magnesium finishes, ceramic materials and cermets, corrosion protection, electro-film and molybdenum di-sulfide coatings, nondestructive testing and inspection methods, and sonic testing.

Another new Douglas material is Acoustimat, an insulator supplied as wide tape, which is used in single ply and multi-ply thicknesses to insure sound, vibration and thermal insulation in many commercial aircraft. It is flexible at low temperature, so that its functions are unimpaired at very high altitudes. It retains its adhesion indefinitely, which certainly contributes to a prolonged maintenance-free service life.

Sintered aluminum powder metal products, while not yet in production, were introduced this year and will find application for temperatures in the 600 to 800 deg. F. range where the lightness of aluminum is desired.

Another new process this year is electroless nickel plating, the plating of nickel without electricity. A hard coating of nickel is formed on most metals and some non-metals with uniform coverage even with recessive areas.

Another process new this year is Dow No. 17 coating for magnesium. The coating is hard and relatively corrosion resistant, although its effect on strength properties is not yet fully evaluated. The coating is brittle and will flake off during flexing if it is not properly impregnated with organic materials.

Hughes

Hughes is primarily engaged in the research, development and production of advanced electronic and armament weapons systems for the military services. The majority of these projects are of a security classified nature and

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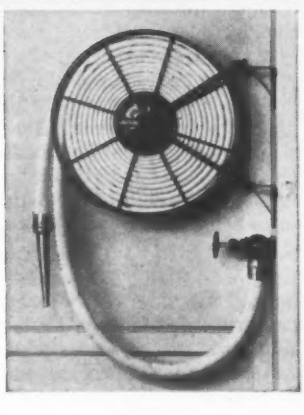

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therefore design and production information cannot be released.

Lockheed

Among the new materials to come to the front during the past year at Lockheed's Burbank plant is 17-7PH. It has the advantages of weight saving and corrosion resistance with good formability and high strength. Its disadvantages, however, are heat-treat distortion and lack of uniform heat-treating.

Titanium alloy Rc130A incorporates light weight, high strength and corrosion resistance, with disadvantages of high cost and poor machinability. Powdered aluminum developed during the past year has been found to have high heat resistance and magnesium powdered metal appears to have high compressive yield strength. On the other hand the latter has poor weight-to-strength ratio.

During the past year Lockheed has investigated the development of stretcher leveled plates for integrally stiffened machined panels. There has also been an investigation of spot welding, fusion welding and flash welding techniques for titanium and its alloys. Techniques for flash welding and extruding stainless steel and titanium alloy shapes are being tried, as well as ways and means for producing sharp bends in large thin-walled tubing. Methods for joggling integrally stiffened panels to reduce the amount of machining and methods for metal gathering on the ends of tubular parts are also being looked into.

Marquardt

During the past year Marquardt has experimented in open air impact forging with two air-operated, horizontal rams for jet engine turbine blades and other precision die forgings on a Chambersburg press. This press has the advantage of greatly reduced amount of impact shock being transmitted to the shop floor; also the ease of installation and low overhead space requirements.

Also being used is metal spinning equipment produced by Lodge and Shipley for their flow-turning process. Electro-spark and/or electro-arc machining of carbides and other difficult materials has now been adapted following the precedent set in Europe. They are used for cylindrical grinding of parallel cutting operations similar to conventional machine shop practice. An enormous increase in cutting capacity and conservation of diamond boart has been realized by the use of these methods.

Ultrasonic machining methods have been adopted by the use of high-cycle transducers such as those marketed by Cavatron & Rayathon Corp.

Among the new materials which have come into heavy use in the last year are titanium carbide and chrome carbides for use on gas turbine blades. These materials have an advantage in extreme temperature conditions exhibiting good strength and wear characteristics.

North American

Due to strike conditions, North American has found it impossible to contribute to this year's aircraft review.

Northrop

Northrop has adopted high-pressure Guerin type hydropress forming at its Hawthorne, Calif., operation. The equipment presently being used operates at 7,500 psi. and is used on small parts. Soon to be delivered is hydropress forming equipment which will accommodate larger parts, far larger than current low-pressure hydropress capacities allow.

Matched metal molds for plastic parts production have been developed to incorporate punchouts and shear edges, thereby producing completely trimmed and pierced parts. Northrop is making drop hammer and other impact type dies from reclaimed thermoplastic materials.

Application has been made of checkout fixtures for electrical and electronic systems, designed with the complete circuitry necessary for high-speed inspection of installation and performance of aircraft components.

Pressurized and heated curing fixtures for bonded honeycomb assemblies have been adopted during the past year. New processes and equipment for the manufacture of non-circular gears have also been incorporated into the operation. New types of equipment for these manufacturing processes include high-pressure hydraulic systems, machines and manufacturing techniques for contouring honeycomb materials, and a portable cable terminal swager.

The foremost new material of the year at Northrop is titanium. It is stronger than aluminum, lighter than stainless steel, and offers a solution to many of the heat and stress problems being encountered in design of future fighter-type aircraft. Indicative of the advanced design thinking going on at Northrop is the fact that during the year a special titanium committee has been established to accelerate incorporation of the new "wonder metal" in Northrop designs. Because of the scarcity and high cost of titanium, one of the chief points of analysis of the committee will be to determine whether each proposal for its use in current and future design projects is economically sound.

Ryan

During the past year Ryan has accomplished extensive work in developing new techniques for fusion and electrical resistance welding. Considerable work has been done in developing techniques for automatic Heli-arc welding contoured surfaces, such as segments of spheres. Progress has also been made in the use of Sigma welding. One job, previously welded manually, is now being welded automatically, resulting in better quality welds and an $80,000 a year saving.

In conjunction with the Taylor-Winfield Co., an intermittent cycling device has been developed for use on seam welders to speed up the welding operation three times over the conventional seam and roll spot welding methods. This resistance welding unit stops the seam weld rolls from rotating as the weld is fired and instantly starts it again until it is positioned for the next weld cycle. Previously, it was necessary to produce eleven spot-welds to the inch to obtain a gas-tight seam-weld joint. This is now accomplished with four spots to the inch.

Ryan has Navy and Air Force contracts to develop typical airframe and engine shroud components from titanium. The new metal is also being evaluated as to its practicality when compared with presently used metals. Prime emphasis in the titanium development has been in the field of forming, both hot and cold. There has been secondary emphasis on developing fusion as well as resistance welding techniques for titanium and its alloys.

In expand forming Ryan has developed and is currently using in production expanding machines capable of exerting 4,800 tons radial pressure. Components which have been previously spun to greater tolerances than permitted by production requirements are either formed in their entirety or sized within the allowable range.

The outstanding development in connection with materials already in use is the application of ceramic coatings to high temperature exhaust systems and jet engine components. During the past year combustion chambers for jet engines have been made of mild steels included with ceramic, and have exhibited stamina and life comparable to the uncoated Inconel chambers which are standard.

Extremely expensive titanium (presently $25 lb.) has come to the front

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AIRCRAFT— . . . Begins on page 70

in the industry-wide battle to keep down weight. A temperamental metal, it requires special handling in the forming, cleaning and welding processes. But the military services are interested in it because of its great strength-to-weight ratio and the possibility that it might be able to replace stainless steel in certain applications at great reductions in weight.

Solar

During the past year, Solar adopted four new developments in its manufacturing operations that were particularly significant: (1) The use of shell mold castings of stainless steel alloys which provide many important advantages over alternative methods; (2) Friction bandsawing of metals, using a toothless strapping technique developed at Solar; (3) New developments in brazing, particularly the development of a new family of brazing alloys known as Sola-Braze; and (4) The use of rubber forming, the technique of using trapped rubber in place of a punch in the forming of metal parts.

The development of ceramic coatings for the protection of metals was advanced significantly during 1953. The advance took two major directions: (1) The first mass production facility for ceramic coating aircraft and non-aircraft parts was put into production, taking the ceramic coating business out of the pilot plant stage. (2) A great deal of important research has been done on development of useful ceramic coatings for low alloy and mild steels. This research should result in new coatings to protect metals against a variety of adverse service conditions, and should be important to designers, engineers and production men.

By-products

In the development of improved manufacturing processes numerous new products and techniques have been developed during 1953. In such cases Northrop's Associated Products department often licenses other manufacturers on a royalty basis to manufacture and market these products.

Northrop has licensed Hufford Machine Works, Inc., El Segundo, to handle its flexible stretch form block used as a machine attachment with stretch presses.

R. H. Froom & Co., Los Angeles, has been licensed to produce a lifting tool designed for handling heavy forming dies.

E. H. Stau Co., Los Angeles, is handling an anchor nut holder used for positioning and holding anchor nut plates in alignment for the purpose of attaching the nut plates to structural parts.

Also handled for Northrop is a cable slack compensator, originally designed for use in the Scorpion F-89 aileron and elevator control systems.

Peerless Machine Co., Los Angeles, is licensed to produce a leak-proof freely rotating swivel elbow fitting capable of withstanding the loads exerted by high pressure fluid flow.

The following new products were developed at Solar during 1953: (1) The Microjet, a unique type of control for jet engines, was announced. (2) New improvements in Solar's line of small gas turbine engines were made and marketing plans for the sale of these power plants to industry generally were developed. (3) The stainless alloy foundry concentrated on the production of shell mold castings and these are being sold to a variety of aircraft and non-aircraft firms. (4) A new type of aluminum welding flux was perfected and is being marketed throughout the United States.

Harvey Machine Co., Inc., has developed a new aircraft structural aluminum alloy known as HZM100.

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UNITED STATES STEEL

ROCKETS—

Majority of nation's production in the West. Liquid-propellant engines being developed

LIKE the aircraft industry, a major portion of the rocket propulsion research and development, manufacturing and test activities in this nation are carried out in the Western States.

Companies engaged in this work are, of course, under contract to various branches of the Department of Defense, and their activities are of a classified nature. However, their general activities may be defined, and the following information has been supplied by the Southern California Section of the American Rocket Society.

The Jet Propulsion Laboratory, which is a part of the California Institute of Technology, of Pasadena, Calif., was organized in 1941. This is a non-profit research and development group. The greater part of the activities are in basic research, although some design work, under specific contract, is accomplished. No manufacturing is attempted.

Grand Central Aircraft Company, of Los Angeles, organized its Rocket Division in March 1952 for the purpose of engaging in the research, development and production of solid-propellant rocket units.

Although this company is occupied principally with the manufacture of various solid-propellant units, some of which were designed and developed at the Jet Propulsion Laboratory, facilities have been available from the inception of the organization for basic research in propellants and for the design and development of solid-propellant units for all applications.

Operations at Azusa

Aerojet-General Corporation of Azusa, California, was organized in March 1942 for manufacture of the solid-propellant JATO. Since that time its activities have expanded to include the design, development, and manufacture of solid-propellant booster rockets, solid-propellant air-to-air missiles, the development of various solid- and liquid-propellant guided missiles and boosters, auxiliary power units, underwater rockets, programs for basic research, and the design of rocket test facilities and instrumentation.

At present all design, development, research, and test facilities are located in Azusa; the solid-propellant manufacturing facilities are located in Sacramento. Aerojet-General Corporation has the largest privately-owned solid-propellant rocket facilities in the United States.

ROCKET engine testing by North American

North American Aviation, Inc., of Los Angeles, began activities in the design and development of large liquid-propellant rocket engines in April 1945. Since that time, as part of the large, integrated program under the Missile and Control Equipment (MACE) operations, the propulsion activities have been expanded to many other research, development and manufacturing programs, such as the development of several types of solid- and liquid-propellant air-to-air missiles, the design and development of liquid-propellant rocket engines for sled-type supersonic research vehicles, and a number of basic research programs.

Several types of large liquid-propellant rocket engines for use in large guided missiles have been developed, and work with these and other propulsion devices which have been designed and developed under various programs is a major part of the activities.

A separate rocket propulsion engineering and manufacturing plant, in eastern Los Angeles, was occupied in 1952, and a comprehensive rocket test facility, isolated from neighboring communities, has been established in the Santa Susana Mountains, just northwest of Los Angeles. North American has the largest and most complete privately-owned liquid-propellant rocket facilities in the nation.

The special provisions and the large amount of isolated area required for the testing of missiles in flight, for the launching of air-to-air, air-to-surface and surface-to-air missiles, for the conduct of supersonic research programs, for the testing of under-water rockets, and many other special requirements, make it necessary that rocket and missile test areas be provided and supported by the government for the testing of devices in their final phases of development.

Desert areas practical

The large, isolated desert areas of the Western States are particularly suited to these activities, and for that reason most of the rocket and missile test stations in the United States are located in this region. The Naval Air Missile Test Center at Point Mugu, California, the Naval Ordnance Test Station at Inyokern, Calif., the Naval Ordnance Test Station annex for underwater rocket testing at Morris Dam, Azusa, Calif., Edwards Air Force Base (Muroc Dry Lake), Calif., Holloman Air Force Base at Almagordo, N. M., and the White Sands Proving Ground, N. M., are comprehensive test facilities operated by the government with service personnel who work in conjunction with the private concerns under contract for the development of rocket propulsion devices.

Since World War II, the range of applications in which rocket propulsion is used to advantage has been closely explored and greatly extended.

Guided missiles

THE GUIDED missile field is so highly classified that *Western Industry* is unable to present at this time much information regarding it, except to point out that the rocket activities described in the accompanying article are only a part of the missile field.

Many companies in the West are participating in the missile program, which has brought into use new materials, components and methods of manufacture. Not the least is the change in manufacturing concept required of men accustomed to putting together a comparatively small number of units of big equipment, who must now adapt themselves to what amounts to mass production of small objects.

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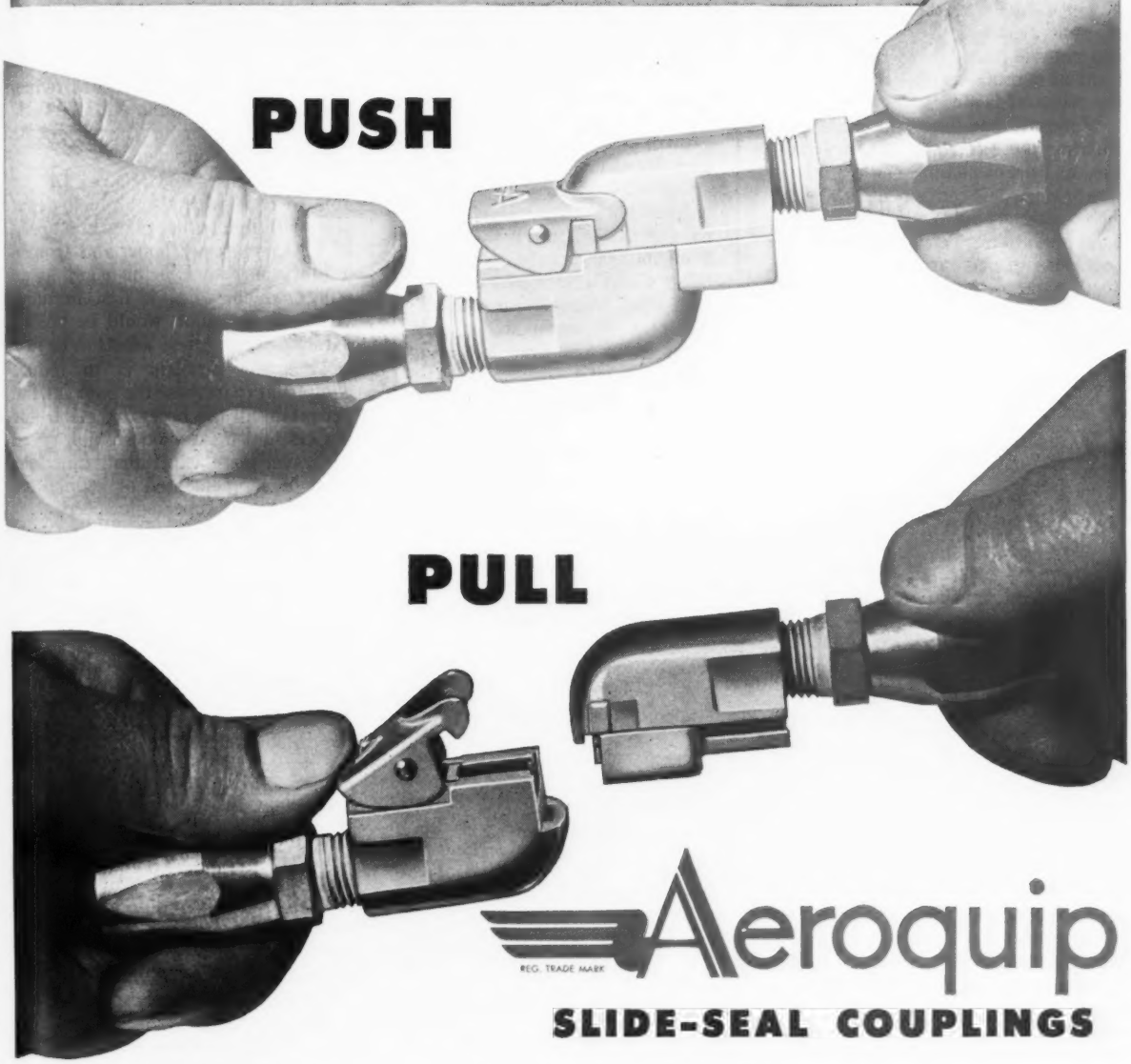

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ELECTRONICS—

Materials handling engineers are mechanizing manufacture of components and TV picture tubes

PROGRESS in the field of radio and electronics for the past year was notable primarily in the development of manufacturing processes and expansion of facilities.

Materials handling specialists are entering the electronic industry picture to help mechanize the manufacture of electronic components formerly manufactured by intricate, delicate hand operations. Television tubes are now being turned out at fabulous production rates through highly mechanized fabrication lines.

Another good example of how progress in electronics is dependent upon other engineering skills is the transistor. Further development of this already widely heralded miracle tool now rests in the hands of the materials man or physical scientist. The presently used materials for transistor manufacture are Germanium, Silicon, and Selenium. They are all plagued with the same two weaknesses; inability to stand moisture and heat.

Transistors can be and have been made moisture proof by sealing them in an evacuated glass envelope, but this, of course, brings the processing back in the direction of vacuum tube manufacturing. Plastic casings have not been successful from a moisture sealing standpoint.

Sensitive to heat

Heat sensitivity in a transistor means that it completely ceases to function as a transistor when the temperature reaches from 70° to 80° C.

Since heat is generated in most electronic equipment, or since such equipment is usually located near a source of heat such as machinery, engines, etc., it is necessary that the transistor be able to withstand these temperatures. This is an important problem to be solved. Materials men must, it appears, discover or develop a new material that will be immune to the ills of the present selection of materials.

When present transistor deficiencies have been overcome, it will have been by the efforts of the physicists and chemists in creating new materials. This points up the modern practice of assigning to a project teams made up of men of several of the sciences.

When will John Q. Public own his first radio or TV set using transistors? That time is spoken of in terms of a year to three years away, by people "in the know."

The man in the street is not suffering from the lack of transistors. Its application in his household equipment or in tools of his trade will probably not materially change their functions at all.

However, the transistor in a hearing aid is a wonderful application especially appreciated by the hard-of-hearing who have come to rely on this aid and yet are completely at the mercy of relatively short-lived filament batteries necessary in the conventional vacuum tube amplifier. Transistors, needing no filament batteries, eliminate this problem and also enable the hearing aid to be materially reduced in size.

The West has some activity in the manufacturing of hearing aids but it amounts to a rather small percentage of the nation's total production. The center of hearing aid manufacturing seems to be in Minneapolis.

Aviation has great need of two of the transistor's most important values. First, its low power consumption (from the plane's batteries and generators) due to its high over-all operating efficiency, has already sold itself to the aircraft industry. Second, the low mass of a transistor recommends it for modern high speed aircraft, where a plane pulling out of a dive creates a high centrifugal force. These G's of pull can build up to tremendous forces that tend to distort or break the delicate parts of a vacuum tube.

Rocket powered missiles have created a much higher demand for low mass electronic components. One such demand will be the ability to withstant 2,000 G's.

Aviation is still furthering the trend toward more radio equipment aboard planes, but there is a practical limitation to the electronics application. The payload capacity must be maintained, whether it be a military or a commercial aircraft.

Here transistors, when further developed, will materially aid in reducing the weight of radio equipment in addition to reducing the weight in power supply equipment.

Human senses and reflexes are unable to cope with the problems that arise with flying a jet plane at a speed of 1,000 miles per hour, and from a military viewpoint, firing a gun at an object which, when it first becomes visible to the pilot, would be passed before he could press a button to fire.

Thus the problem is to reduce equipment to increase the payload and yet retain all the necessary electronic devices that make modern high speed air travel possible. Human functions must be supplemented or supplanted when flying at supersonic speeds.

Electronic devices are constantly seeing wider application by industry, yet industry has not employed them as fully as it could. The reason is probably because a vacuum tube is not considered reliable enough. Of course this might be the policy of a company that would employ an electronic calculator in the front office for handling complex mathematical problems and yet shy away from electronic equipment in the plant.

Stanford Research Institute at Stanford University, Calif., and Hughes Research and Development Laboratories in Culver City, two of the country's finest research organizations, have groups working on transitor development, methods of manufacturing and applications in equipment.

The following table based on data collected by the Radio-Electronics-Television Manufacturers Assn., shows television set shipments to dealers in the eleven Western States for the first 10 months of 1953:

State	No. of sets
California	424,515
Washington	117,071
Oregon	65,995
Colorado	59,979
Arizona	32,436
Utah	31,095
New Mexico	16,097
Idaho	15,489
Nevada	8,614
Montana	7,403
Wyoming	2,882
Total	781,576
Entire United States	5,305,072

. . . And still growing

THE ELECTRONIC manufacturing industry on the West Coast has shown phenomenal growth and development in the past decade.

California electronic factories employ 51,000 persons, and have an annual output valued at $700,000,000, according to the West Coast Electronics Manufacturers Association, with members in seven states and Councils in San Francisco and Los Angeles.

INSTRUMENTS—

Trend toward simplified, lower priced instruments to fit budgets of the smaller plant

THE IDEA MEN were busy as ever last year concocting new instruments to think, analyze, measure, count and supervise industrial processes, so that 1953 started out in high gear.

Selling grew somewhat tougher after mid-year, affected by growling among budget-conscious plant managers. But since the instrument industry, with the world its oyster, lives mainly by finding unfilled needs in research and production and filling them, no one was alarmed. There were plenty of needs in sight, particularly among Europe's reviving industries, as well as among smaller U. S. plants.

Sales strategy in the latter field revolved around the philosophy that the smaller a plant's technical staff, the more it needs instrumentation. For instance, a small laboratory's only chemist finds much of his time taken up with routine operations such as titrating, hence his productive efforts can be multiplied by turning over such messy and time-consuming jobs to an automatic instrument.

Mechanized testing

Routine production tests, such as checking metals for chemical impurities, can be mechanized with direct-reading quantometers. One secondary metal concern with two spectographers in its laboratory recently reported turning out 14,000 qualitative samplings of castings in two eight-hour shifts.

Large Western plants already have swung strongly toward tighter process control, spurred by stringent inspection requirements of military contracts. The past year saw a trend toward simplified, lower-prices instruments to fit budgets of small plants.

Meanwhile, Western instrument manufacturers pushed their overseas operations, despite low-cost labor competition in England and Germany. Reports are that the formidable technical wizardry offered by pre-war Germany no longer exists, although Zeiss occasionally contrives to get a few goods out through the Iron Curtain. Italy, however, is competing strongly.

Foreign exchange offers many problems. Nevertheless, Applied Research, for instance, established a branch at Lausanne, Switzerland, and commissioned sales agents throughout the North European countries, while

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J. M. Moore, 903 U. S. National Bank Bldg., Denver, Colorado

INSTRUMENTS—

. . . Begins on page 83

Beckman started construction of a manufacturing plant at Munich.

This mushrooming concern by spring will consolidate part of its production in a new $2,000,000 headquarters plant now being built at Fullerton, California, grouping some of the work now being performed in some 20 buildings scattered around Pasadena. Phenomenal growth of electronic counting devices during the past year also led Beckman to expand threefold its recently acquired computer plant at Berkeley, California.

Joining this fast-growing coterie of "electronic brain" manufacturers were Consolidated Engineering, which set up a new division in the computer field, and Logistics Research, a Redondo Beach concern which predicts a Model T-type revolution resulting from lower-priced equipment adaptable to almost every type of industry.

Magnetic drum computer

Another entrant in the computing field is the Marchant calculating organization of Emeryville, California, who set up in 1952 a subsidiary known as Marchant Research. The latter has developed a versatile magnetic drum computer in the lower priced field which will be marketed by the parent company, Marchant Calculators, Inc.

Markets envisaged for such gear include computation and preparation of payrolls and bills, keeping of insurance, social security and personnel records, making economic studies and business forecasts, scheduling production time on machines, regulating priorities to move some jobs faster, figuring overtime work, and deciding which jobs to subcontract well in advance of an anticipated bottleneck.

An example of such trends in the West is Douglas Aircraft, which five years ago had less than 500 sq. ft. of space devoted to computing equipment but which today has such machines occupying more than 12,000 sq. ft., with the end not in sight.

New developments in instrumentation include use of new recorders for stress, vibration and mechanical motion. Consolidated Engineering, for instance, reports that a very compact recorder, built so small it could fit inside a rocket, proved valuable to oil companies for registering stresses in drilling. Other recorders are being miniaturized to the extent that they may even be run through a vein into the heart.

Use of mass spectrometers for process control are another step toward the automatic factory. Applied Research Co. brought out a multichannel quantometer suited to many varied plant needs, pointing out that the quantometer also obtains results in terms of electrical units, and thus can be harnessed up to electronic "brains" to give direct control of production processes—the single apparatus makes the test, decides what is necessary, and bosses the job of getting it done.

MOVIES—

3-D bubble bursts, widescreen projection a hope
Cost cutting, better photography, color foreseen

WIDE-SCREEN pictures may have helped the box office but they also boosted studio costs, spurring the industry's Motion Picture Research Council to a new search for production shortcuts. Larger sets for the spectacular costume dramas greatly augment lighting demands, and floodlight reflectors, housings and lenses have been redesigned to accommodate incandescent lamps as large as 15,000 watts, triple the usual size.

What 3-D didn't do

Intensified also is the need for more economical as well as lighter and stronger set-building materials. Biggest recent advance has been "peel" paste enabling paint and wallpaper to be stripped off cleanly, permitting reuse of the plywood flats comprising the standard set-building unit. Photographic wallpaper is saving labor in scene backgrounds and also in floor effects such as parquetry.

High cost of polyesters has limited their use as plaster substitutes, but progress has been made in toughening plaster by amino resins in water slurry, permitting casting instead of carpentering of window frames, stair steps, and intricate architectural details.

Another large expense—foliage for decorating sets—is being cut by various flameproofing materials such as pigmented rubber emulsions. Stringent fire regulations now require replacement of natural cut foliage after two days and the trend is toward vinyl foliage, which looks real yet can be created to order on the drafting board to fit the mood of fantasy pictures. White foaming materials used in fire fighting are replacing the old reliable corn flakes for snowstorm effects. Another new snow consists of balsa wood shavings, cut up to desired flake size, bleached and fireproofed.

The Motion Picture Research Council, in combination with a group of architects, has designed a new drive-in theater screen 3½ times brighter—equal, with a moderate-sized projector, to indoor theater brilliance. A specular aluminum paint is used in combination with myriad small cups on the screen to direct light back into the viewing area instead of wasting it in random reflection. Thus the "ozoners" can open earlier in summer, are proof against interference from nearby street light or the moon, and can show stereoscopic types of films.

Materials needed

Much soul-searching has resulted from 1953's 3-D bubble, which may not have collapsed but certainly shrank almost as fast as it expanded. During the hectic months following the spectacular success of "Bwana Devil," 33 of the goggle-type pictures were cranked out in frantic haste, but at year's end not one new one was definitely scheduled. Industry experts blame part of the decline on inferior productions, careless projection, and general inexperience by all hands.

Hopes now are pinned on better photographic quality, clearer color rendition, and more elaborate productions to offset the letdown in public interest. New processes are now ready in color control, with better filters, less negative film grain, larger negative area, plus a trend toward sharper lenses for greater illusion of depth.

Advent of magnetic picture recording as brought out for TV use is discounted by film experts, who say the quality would not meet theater standards of definition, since the amount of picture detail that can be recorded on 13 channels of tape would not begin to compare with the equivalent 990 channels afforded by standard 35-mm. film.

With 2,000 theaters now dark and 5,000 of the 16,000 U. S. movie theaters currently operating in the red, the industry is waiting to see whether pictures less spectacular than the record-breaking "The Robe" will draw box office returns sufficient to warrant widespread conversion to wide-screen projection.

Polaroid reports it has developed more comfortable viewers, cheap

enough to throw away after use, and a new film compatible with other systems will permit operation with one projector instead of two. Major studios, which were slow to hop aboard the original 3-D bandwagon, are willing to back further experiments in this field, but considerable encouragement may be necessary before theater owners generally decide to make the rather considerable investment required.

RAILROADS—

Gross revenues hit new high due to freight rate increase. Passenger traffic is declining

OPERATING REVENUES of the country's Class I railroads reached a new high in 1953. Final figures will not be available until late in January, but preliminary estimates indicate that they may be above $11,000,000,000 for the first time, as compared with $10,581,418,145 in 1952, the previous high.

Increase in gross revenues has been due to the higher level of freight rates effective throughout the year, rather than to heavier traffic. Preliminary figures for the full year show continued decline in passenger service volume, measured in passenger miles, and point to little if any increase in freight service volume, measured in revenue ton miles.

Greater gross revenues naturally were productive of improvement in net railway operating income, which is the margin of intake over operating expense and tax outgo. It now appears that net railway operating income in 1953, while substantially better than in 1952, has not afforded an earned return on net property investment exceeding that experienced in 1948 and 1950. The earned rate of return in those years was 4.24% and 4.23% respectively.

Results in 1953 consequently indicate that increases in freight rate levels since 1948 have not produced revenue increases in excess of the increases in operating expenses and taxes that have preceded or accompanied them. Encouragement due to improved results in 1953 also is somewhat dampened by experience in the later months of the year.

Carloadings have been below those in corresponding periods of the preceding year steadily since August. Revenues consequently have been less favorable than in the corresponding months a year ago.

Gross revenues and net earnings both were better in each month through the fore part of this year than

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CHICO MUNICIPAL AIRPORT

CHICO, BUTTE COUNTY, CALIFORNIA

RAILROADS—

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in 1952. Beginning in September, however, declines in both gross and net began to appear where increases had been shown in immediately preceding months. While some decline in traffic influenced this reversal of trends, it was principally due to the fact that freight rate levels through the first half of 1952 were substantially lower than those effective after July 1, 1952, and since. Improvement in the overall railroad showing in 1953 has been due more to better results in the first half of the year than to experience in later months.

Programs for improvement outlays in 1954 will of course be affected by conditions as the year advances. Present plans indicate that they will correspond to those in 1953 if revenue conditions are encouraging. There may be some decline in capital expenditures for equipment, but budget plans thus far point to increased expenditures for additions and betterments to roadway and other fixed facilities.

In this connection it should be noted that expenditures for fixed facilities frequently are influenced more by current revenue conditions than are expenditures for new equipment. The latter usually may be financed largely through sale of equipment trusts while the volume of expenditures for fixed facility improvements usually depends more on current margins in net earnings.

Equipment buying off

As the dieselization development that has been so marked in recent years approaches completion, expenditures for new locomotives may be expected to show some decline. Likewise, there may be some decline in expenditures for new freight car equipment, especially if there is a falling off in traffic pressure. In any event, emphasis on expenditures for roadway and fixed facility improvements, rather than on equipment expenditures, appears likely to be more marked than it has been in recent years.

Improvement planning for 1954 now indicates that the program for the year will involve total capital expenditures approximating those in 1953, although the rate at which it progresses will be affected by conditions which cannot now be predicted accurately.

Incomplete figures as to capital expenditures in 1953 now indicate a total of $1,184,600,000. Although about $100,000,000 under actual capital expenditures in 1952, this will be the sixth successive year in which addition and betterment expenditures have exceeded a billion dollars. Capital expenditures by Western district lines in 1953 have been about 15% greater than in 1952, as compared with a decrease of 29.6% by Eastern district lines.

In 1952 approximately three-fourths of total capital expenditures was for equipment and there was an even greater proportion of the total for equipment in 1951. Increased attention has been given to line, yard and terminal improvements in 1953, and to the installation of centralized traffic controls and other signaling and communications installments that reduce terminal delays and facilitate train movements, while at the same time producing operating economies.

Such improvements are contributing greatly toward reducing costs and to reductions in train schedules.

In the first half of 1953 actual capital expenditures for roadway and other fixed facility improvements were greater than in the first half of the preceding year, while those for equipment were about $75,000,000 less.

For the full year final figures will show capital expenditures for additions and betterments to roadway and fixed facilities more than half as great as those for equipment.

GLASS—

Container demand hits all time high thanks to dietetic foods, coffee powder, wine, baby food

GLASS container production, without the stimulating industrial economic effects of the Korean conflict, continues to increase. Demand is at an all-time high, with West Coast container shipments reaching a new peak, and is expected to follow this trend, in spite of the generally prognosticated 1954 over-all production softening.

Executives in the West Coast glass container industry point to the following fields which are stimulating their business:

1. Dietetic foods and drinks, which are becoming more and more a factor in our economy.

2. The increasing popularity of glass-packed baby foods on the West Coast (60% of all baby foods packed nationally are in glass containers), with the possibility of more West Coast baby food plants marketing their product in glass pack.

3. Consumer demand for wine vinegar, a relatively new, small volume product, gaining in popularity.

4. The marked rise in soluble coffee production, which represented 5% of the total coffee production in 1948, to a current 21%.

5. The construction and development of West Coast breweries by five leading Eastern brewers during the past year.

6. The impact created by the large super-market centers in which the personnel are service employees, not always sales people, and where products for sale in glass containers are their own salesmen.

7. Steadily increasing consumer demand for beer in one-way no deposit bottles, and

8. Even in those markets where carbonated beverages are for sale in cans, the glass industry has no-deposit bottles developed and available for those bottlers' customers who do not wish to return bottles.

The glass container industry is alert to the markets touched by polyethylene and metal containers, and while a small percentage of those markets have switched to the other containers, glass container industry believes that no serious inroads will result.

Advanced technology in glass containers has produced a finer, more durable, and economical glass container than consumers heretofore have enjoyed.

Nuclear chain reactors

Nuclear chain reactors or piles in the West are located as follows:

Hanford, Wash.: plutonium production piles

Arco, Idaho: National Reactor Testing Station (three)

New Mexico: Los Alamos Scientific Laboratory (research reactor)

Livermore, Calif.: California Research & Development Company ("water boiler")

Downey, Calif.: North American Aviation, Inc. (research reactor)

TUNGSTEN—

THIRTEEN NEW so-called tungsten mills (practically all of the mills in the eleven Western States also process other ores) were under construction in the West last year, and eight of these were scheduled for completion before the end of the year. Three mills closed down and are not expected to resume operations in the foreseeable future.

Tungsten production in the West for 1953 is estimated by the Tungsten Institute at 440,000 tons, compared with 380,986 tons in 1952. There has been a trend toward working lower grade ore, in part by open-cut methods, and an increase in the quantity of ore shipped to custom mills. The combination of gravity and flotation equipment for ore treatment is the most popular.

Nearly all domestic producers now sell to the government under the Domestic Tungsten Program, which has been extended to June 1958. Forty-two per cent of the output was consumed in 1952 in hydrogen reduced metal powder.

COPPER—

U. S. OUTPUT of copper in 1957 will be 1,165,000 tons, it is estimated by Frank J. Tuck of the Arizona State Department of Mineral Resources, of which Arizona's share will be 536,000 tons, an increase of 136,000 annually over present Arizona production.

It is expected that the increase in copper production will not only absorb all workers idled by the lead-zinc shut-down in the state, but also add 3,000 workers to the state's mine payrolls.

Some $200,000,000 is being spent in development of new ore bodies, of which $94,000,000 is from federal financing. The Arizona leaders are: Magma Copper Co., sole owner of San Manuel Copper Corp. and the properties it is developing at Mammoth and Tiger in Pinal County; Phelps Dodge Corp. at Bisbee; American Smelting & Refining Co. at Silver Bell in Pima County; and Bagdad Copper Corp. in Yavapai County.

A fifth mining firm, Miami Copper Co., is spending $15,000,000 on its Copper Cities property which will soon replace its closed Castle Dome.

Meanwhile Anaconda Copper Mining Company is adding big capacity through its Greater Butte development in Montana, and in expansion at Yerington, Nev. There is also additional capacity being added in Michigan.

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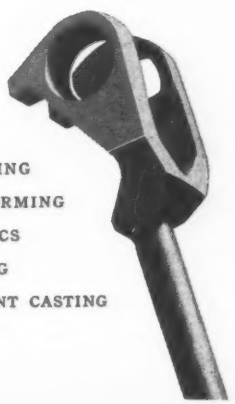

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STEEL—

Western operations will maintain high production although national production will drop off

MORE STEEL than ever before was made in the eleven Western States in 1953, production being estimated at around 6,900,000 tons, or 12% greater than in 1951, the best previous year. Ingot capacity has increased from 4,800,000 tons in 1946 to 7,063,000 in 1953.

Although national output of steel is expected to be at a lower level in 1954, Western steel operations will probably be maintained at a higher rate than elsewhere in the nation, according to Alden G. Roach, president of the Columbia-Geneva Division of U. S. Steel.

Where Western producers supplied only 40% of Western requirements in 1940 they now supply 75%, he points out. Major additions to the West's producing capacity last year included the second major expansion since the war at the Pittsburg works of Columbia-Geneva for the production of sheet steel and tin plate products, Colorado Fuel & Iron's seamless tube mill at Pueblo and the Kaiser tin plate mill at Fontana.

The market for steel mill products in the seven Western States for 1953 was estimated last November by Kaiser Steel Corporation as 6,300,000 tons, exceeding the 1951 record consumption of 5,981,000 tons. Approximately 58% of this steel is supplied by production from Western mills, and 42% from steel mills outside the seven Western States.

Production of steel ingots—semi-finished steel—was estimated at 5,200,000 tons for mills located in the seven states, an 8% increase over 1951. This indicates operations at 93% of reported rated capacity in place at the beginning of the year.

A sub-regional breakdown by the Kaiser planners of the 1952 gross steel receipts within the seven Western states of California, Oregon, Washington, Idaho, Arizona, Nevada and Utah is as follows:

	Tons	%
Southern California	2,227,000	41
Northern California	2,106,000	39
Oregon and Washington	794,000	15
Arizona, Nevada, Utah and Idaho	288,000	5

The Western market is dominated by the effects of capital expenditures to a greater extent than the United States as a whole, because the West is a growing economy. Steel for construction, oil and gas production and railroads accounts for a far higher proportion of the steel consumed in the West than elsewhere.

Construction, which represents an estimated 35% of steel consumption on the Pacific Coast, accounts for only approximately 20% in the nation as a whole. On the other hand, manufacturing activities, accounting for two-thirds of the national steel consumption, account for only approximately 40% of Pacific Coast consumption.

As population continues to grow, and the West develops further, it may be expected that the proportion of steel consumed in manufacturing industries will tend to increase to a point much closer to the national level.

Western market break-down, 1952

(Computed by General Planning Department, Kaiser Steel Corporation)
(in thousands of net tons)

Steel mill product	Southern California	Northern California	Oregon, Washington	Ariz., Utah, Nevada, Idaho
Plates				
Sheared plate	311	434	90	70
Universal mill plate	14	10	8	2
Structural shapes				
Wide flange beams	45	46	17	12
Standard structural shapes	110	94	59	31
Hot rolled bars and bar size shapes				
Carbon	227	150	95	18
Alloy	67	9	6	1
Concrete reinforcing	151	155	128	23
Hot rolled sheets	227	145	25	5
Hot rolled strip	27	15	7	1
Cold rolled sheets	130	60	14	2
Cold rolled strip	45	15	2	—
Standard and line pipe				
Pipe 4" and under	156	90	25	17
Pipe 5" - 12¾"	100	50	17	20
Tin mill products	165	538	147	17
Galvanized sheets	63	60	22	4
All other mill products	389	235	132	65
Gross total	2,227	2,106	794	288

Consumption more than doubles

Steel mill product receipts
Seven Far Western States

(Computed by General Planning Dept., Kaiser Steel Corp.)
(in thousands of net tons)

Product group	1952	1936-1940 Average
Plates, sheared and universal mill	939	150
Structural shapes	414	185
Hot rolled bars and bar size shapes	1,030	288
Sheets and strip	869	285
Standard and line pipe	475	212
Tin mill products	867	399
All other mill products	821	611
Gross total	5,415	—
Conversion of receipts into mill products*	68	—
Net total	5,347	2,130

*Steel mill products received in the seven Western States and converted into tubing, cold rolled strip, and cold finished bars have been subtracted from gross receipts to avoid duplicate reporting of the same tonnage.

FIRE EQUIPMENT—

Industrial, forestry and first-aid fire fighting equipment in step with population growth

POPULATION GROWTH in the eleven Western States has improved the field of portable fire-fighting equipment to the extent that there has been a decided increase in sales of first-aid fire-fighting equipment in this area. California has shown the largest gain.

Manufacture or assembly of fire trucks during the past year is estimated at between 300 and 400. Two of the largest firms in this field are P. E. Van Pelt, Inc., Oakdale, Calif., and Coast Manufacturers, Inc., Concord, Calif.

A number of firms produce industrial fire-fighting equipment and forest fire-fighting equipment.

Products of the fire extinguisher industry have improved with the use of stainless steel tanks, better valves, improved nozzles and increased production. With these improvements, cost of fire extinguishers is still no higher than prices during World War II. All fire extinguishers manufactured by members of the Fire Equipment Manufacturers Association, Inc., are tested by the Underwriters Laboratories and bear their seal.

ALUMINUM—

Fabrication in the West shows steady increase as this metal becomes more readily available

THE MOST significant factor for the aluminum industry in the West, as throughout the nation, is the broader availability of the metal to fabricators and users of the various mill products. This encourages manufacture of products previously withheld because of aluminum shortages, and helps others to grow toward maturity.

In the Pacific Northwest, for example, the expansion is reported as more than 26% since 1950, with 511 firms using the metal in 1953, as against 406 in 1950. Twenty-one companies use aluminum in making trucks and trailers, seven in Washington alone for ships, boats and marine supplies, and 59 foundries in Washington and Oregon now work with aluminum. Some current models of automobiles have over 50 pounds of aluminum, as compared with the former average of only seven pounds per car.

Outstanding is the rapid progress made in architectural applications, notably the curtain wall, and the production and use of semi-rigid containers for food products and of portable irrigation systems, in both of which the West is a leader.

Civilians get most

Automotive and electrical applications of various kinds broadened considerably in 1953, and will expand in the future because the larger supply stimulates heavier demand. It is not always realized that the bulk of the aluminum market is for civilian uses; even in 1953, a year of high military usage of aluminum, that market accounted for only about a fifth of the total volume.

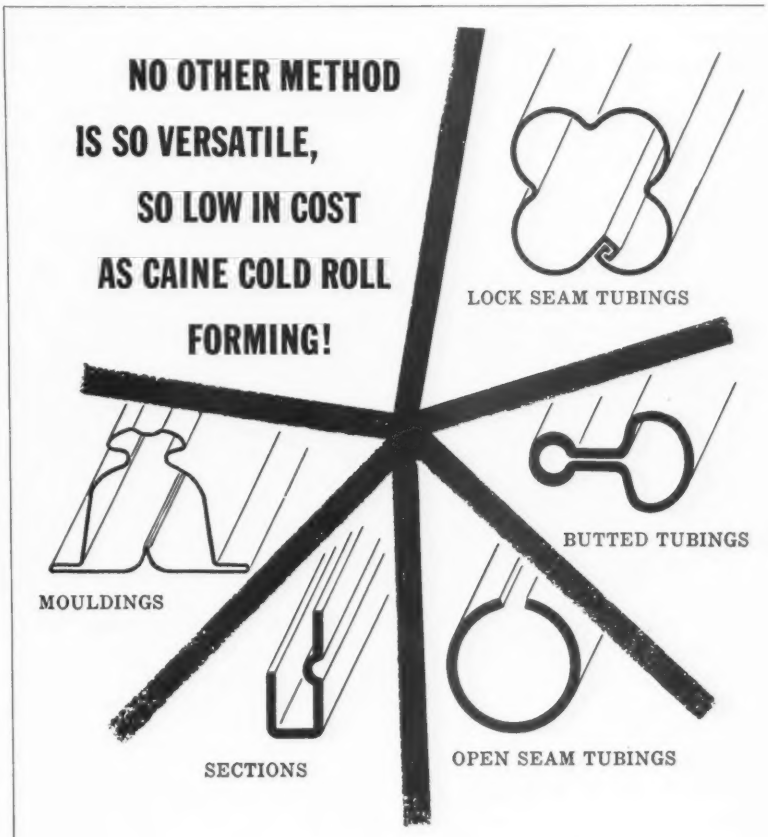
In the food field, Sunkist Growers, Inc., who market most of California and Arizona's citrus fruits, are cooperating in studies on the use of aluminum-foil-lined cartons for storage. Storage and handling over periods of 30 to 60 days are reported possible without ventilation of cartons or concern over temperature.

Output breaks record

Preliminary estimates of the 1953 production of primary aluminum in the United States total an all-time high of 1,200,000 tons, with consumption higher because of the use of secondary and foreign metal. The Pacific Northwest's output for 1953 is estimated by Bonneville Power Administration as about 475,000, compared with 349,000 tons in 1952. The increase was due to practically continuous production (interruptible electric power for making aluminum was cut off for the last four months of 1952) plus the addition of some new facilities.

Although part of the next round of aluminum expansion will near completion by the end of 1954, it seems unlikely any of the new plants will be producing to any extent until the following year.

It is noteworthy, from the point of view of the Pacific Northwest's overall position in the aluminum industry, that at the present time there are no definite commitments for further ex-



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ALUMINUM—

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pansion of primary reduction facilities in the southern states to use electric power generated from natural gas.

Indicative of the growing Western market for aluminum mill products are expansions in other facilities by the major aluminum producers.

Alcoa expanded its product line at Vancouver, Wash., rod and conductor mill by installing extrusion equipment. It also installed there for experimental purposes one of the Properzi machines for the continuous casting of aluminum rod.

Kaiser Aluminum installed and began operating a 5,000,000-lb. plate stretcher, the world's largest, at its Trentwood rolling mill to produce plate of more uniform mechanical properties. Production also began on welded aluminum tubing on a new high-speed Yoder roll-forming mill using the induction welding process. Initially this tubing is being produced in sizes for use in portable irrigation systems, but other sizes for such applications as furniture tubing are planned.

Reynolds is broadening facilities at its extrusion plant at Phoenix, Ariz.

Among the future developments are the aluminum rod and wire producing facilities planned by Anaconda at Great Falls, Mont., which will use primary aluminum from its reduction facility in the same state. It is also reported that Anaconda may also eventually install a sheet rolling mill. Both of these are of especial interest for their indications of the extent to which this great copper concern is moving into aluminum. Another copper company, Kennecott, bought a minority interest in Kaiser Aluminum late last fall.

ZINC—

Consumption in the West for 1953 18% greater than 1952

CONSUMPTION of slab zinc in eight of the 11 Western States for 1953 has been estimated by the Bureau of Mines at approximately 53,000 tons, an increase of about 18% over 1952. Consumption for 1952 was 45,768 tons, as compared with 48,473 tons in 1951. Mine production of recoverable zinc in the Western States averaged 32,138 tons monthly in 1952, but the January-March average in 1953 was only 27,662 tons, while the output in September was down to 22,913 tons.

MINING—

Uranium, the catchword that sends both big and little prospectors into the Colorado Plateau

URANIUM is the catchword that is taking the prospector, be he an individual or the largest of mining companies, into territories where there is even the smallest indication of an uranium find. This activity is welcome at a time when base metal mining is in the throes of readjustment of costs and prices.

The Colorado Plateau of Arizona, Colorado, New Mexico and Utah is the center of uranium mining, while search is being made in Wyoming, Montana, Idaho and other areas. A discussion of some of these operations may be found in the Atomic Energy review elsewhere in this issue.

In general mine operations, some of the trends are reported by Richard M. Stewart, testing engineer for Anaconda Copper Mining Company, as follows:

Untimbered trend

The trends in narrow vein mining are toward untimbered stopes in veins which have always been timbered in the past. This radical change is made possible with a closely controlled mining cycle.

Many elements are essential in order to substitute successfully horizontal breast cut and hydraulic fill stoping for conventional square set stoping. Most important is a de-slimed sand fill placed hydraulically and always kept within 8 to 10 feet of the back, thereby exposing a minimum of hangingwall. Pattern rock bolting is used to prevent initial movement of the hangingwall and back.

More push feed drills are being used, because they permit parallel horizontal holes with depths of eight feet to as much as 16 feet where normal stoper round used to be five to six feet deep. These holes are loaded with low strength dynamite and are blasted with electric milli-second delay caps, thereby causing the least possible shattering of the wall rock and yielding good fragmentation.

More oomph to removal

More powerful slushers and larger scrapers are being used to remove the ore from the stopes. The slip-on detachable tungsten carbide insert drill bits have been perfected to the point where eight to ten regrinds are realized with carefully supervised drilling and grinding techniques.

As a result of these changes, horizontal breast cut and hydraulic fill stopes are mined much faster than conventional timbered stopes. The non-productive time of timbering and filling with waste is greatly reduced. Therefore, a greater portion of the miner shift is utilized in breaking ore and higher productivity is realized.

There is less miner fatigue due to improved ventilation and lighter equipment. Less skill is required of the stope miner, because he does not need to know timbering. Stopes progress more rapidly and the ground is supported immediately so that ground movement is not allowed to start.

There is a trend toward increased use of concrete for ground support in semi-permanent openings. The additional first cost of concreting is often compensated for when the costs of retimbering and lost production resulting from timber failure are considered.

Mechanical handling of timber and supplies is being expanded. Fork lift trucks and palletized unit loads are becoming standard in mine yards and warehouses. In drifting, the column bar and arms mounting drifters is becoming obsolete since the perfection of push feed drills. Pneumatic tools such as saws, impact wrenches, chisels, small drills and tools are being used more extensively to reduce labor costs.

The increased demand for potash and potash chemicals is a constant challenge to the operators in the Carlsbad (N. M.) Basin. The search for new methods and improvements to existing facilities continues. Two of the companies are investigating the use of a Koepe type hoist. Industrial television is being considered in hoisting. Shaft sinking methods have changed. The newer properties are using round shafts. All of the operators in the Basin feel that the next few years will show further improvements in mining methods at Carlsbad.

The introduction of the continuous miner, diesel-electric locomotives and conveyor hauling within recent years is considered by the potash people, like other mining groups, to have done more to change mining methods than any other technological changes.

ELECTROPLATING—

More decorative and ordnance work coming up. Trend toward automatic, conveyorized plants

ALTHOUGH government control of nickel for electroplating has been lifted, the three major suppliers will follow a self-imposed allocation system. This may result in less nickel for users next year than under government control. Nickel will be in short supply for probably another year.

The trend in production methods in the San Francisco Bay Area is toward the use of automatic conveyorized equipment. Schlage Lock and Friden are the only users now, but Marchant, Pressed Steel Corporation and McClellan Air Force Base, Sacramento, will soon follow. McClellan's will probably not be in operation for nearly a year.

Decorative business up

Substitute finishes tried during the last year were reported not successful in preventing corrosion.

There will probably be more decorative plating business in the coming year, including brass plate and chrome. There will be an increase in arsenal work, hard chrome plating going for two purposes: (1) to reduce the coefficient of friction; (2) to resist erosion. The Navy has been doing hard chrome plating of gun barrels for some time and has found that shells will go faster and farther, due to a reduction in friction.

More ordnance work

There will be more ordnance work coming up in 1954 and an increasing demand for protective coatings by industry. In the decorative plating field many manufacturers are starting to plate in their own shops in order to have better control of the work.

Pan American Airways has installed a large repair shop at South San Francisco with a complete plating installation where all kinds of work are done.

More and more equipment for plating is being built on the Pacific Coast. This includes rheostats, rectifiers, tanks, etc. Since freight on complete plating installations is high and they have to be shipped out from the East in one piece, it is expected that complete plating equipment will soon be made out on the Coast.

L. H. Butcher, Los Angeles subsidiary of Udylite Corp., is putting in a complete plant to make tripoli and other cleaning preparations, thus entering into a field already occupied by Turco and Kelite.

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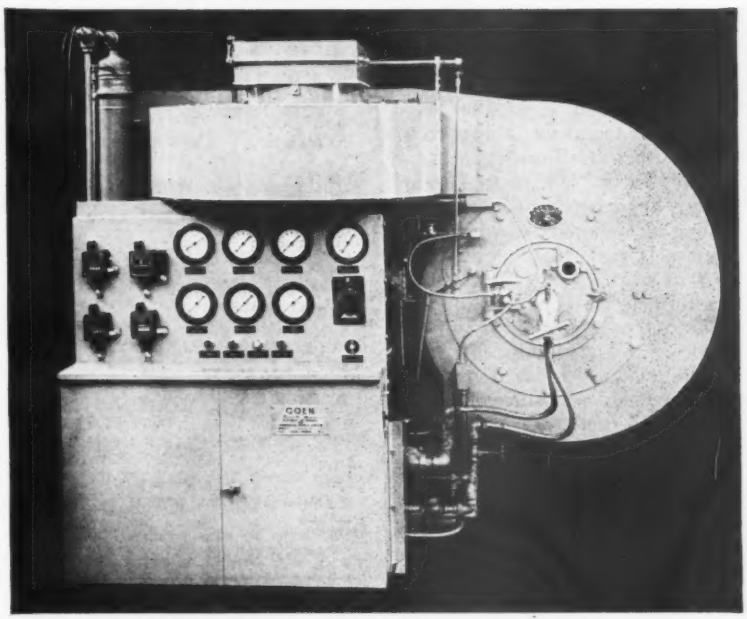

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GRAY IRON FOUNDRIES—

Mechanization particularly urgent in the West because of high costs, especially of materials

SEARCH for cost-cutting foundry methods will intensify in 1954 as result of a squeeze between reduced volume of business and higher operating costs. Mechanization of materials-handling is considered particularly urgent on the West Coast because of high costs, notably due to long hauls for coke, pig iron and sand.

Foundrymen have renewed their search for nearer sources of sand, spurred by increased freight rates. Most Southern California plants, for example, import sand from Nevada. Trend is toward increased use of shell molding machines, where production runs are large enough to justify. A new type of core blower is attracting attention because it costs less to rig up.

Rising activity was noted in production of special metals for aircraft. Licensees under nodular iron patents have found expanding demand in this field for their products on the basis of high hardness, strength and ductility. Growing use of titanium in jet planes has stimulated need for dies that can be heated to temperatures as high as 850 deg.

With heavier-gauge materials, demands upon dies are becoming stringent, beyond the strength range of kirksite and allied materials. Other markets for this close-grained metal are opening up in agricultural implements for parts subject to high shock, and in some types of high-pressure valves and pipes.

Slowdown in latter '53

Most gray iron foundries in Southern California felt a strong downdraft at mid-1953 after exceptionally good business in earlier months. By year's end, the six-day week was hardly more than a memory and overtime was being cut to the bone, with substantial layoffs in some plants. The slowdown stemmed chiefly from widespread caution of most industries in making new capital goods commitments, and from a sharp drop in oilfield equipment buying. Military contract work continued brisk. By autumn, scrap inventories began to pile up, ending the scarcity, and scrap yards were making price concessions. Offsetting savings in reduced overtime were higher labor costs, up about 15 cents an hour, with another round of demands just ahead in early 1954.

Shipments of castings
(from U. S. Census Bureau)
short tons

GRAY IRON

	1953 (8 mos.)	1952	1951
Mountain, total	236,335	289,493	323,748
Montana, Idaho, Wyoming	7,288	10,608	13,489
Colorado	53,147	77,490	84,512
New Mex., Ariz., Utah, Nevada	175,630	201,395	225,747
Pacific, total	347,747	445,219	472,024
West, total	584,082	734,712	795,772

STEEL

Mountain, total	17,263	19,796	21,471
Montana, Idaho, Wyoming	—	—	—
Colorado	7,576	12,060	12,205
New Mex., Ariz., Utah, Nevada	8,687	7,736	9,266
Pacific, total	66,085	100,840	110,946
Washington	10,976	18,165	15,776
Oregon	9,799	15,321	18,255
California	45,507	67,354	76,915
West, total	83,348	120,636	132,417

MALLEABLE IRON

	1953 (7 mos.)	1952	1951
California	5,186	—	—

Estimates are based on sample survey, subject to sampling variability.

In Los Angeles, most foundries had the choice of installing smog controlling equipment or discontinuing use of the cupola. For large plants this represented capital outlays ranging from $50,000 upward, although some smaller operators were able to continue with use of gas furnaces.

Some foundrymen look for a pickup in early 1954, but a good many expect nothing better than a leveling-out, feeling that readjustment was overdue and that operations on a five-day week basis can continue without causing real hardship.

Capacity expansion

In the San Francisco Bay Area there was considerable expansion of capacity, and business was good until late in the fall. Cutbacks in government programs may have been responsible for the slowing down. Shell molding is attracting many foundries, and phenolic resins for sand casting are making good headway.

The Portland area has seen a change from a seller's to a buyer's market, and progressive foundry managements have been quick to adjust themselves to the change and go out looking for business.

"We seem to be getting back to normal," reported one leading operator in the Puget Sound district, "but it has been so long since things were normal that a lot of us don't recognize it as such."

NON-FERROUS FOUNDRIES—

Mass production of light metal castings reaches the West. Order backlogs melting away

MASS PRODUCTION of aluminum and magnesium castings, as practiced in the East for automotive components, is being adapted to aircraft work at Alcoa's Vernon plant. Method involves molds made of plaster and sand, or of plaster in combination with permanent iron molds, the objective being greater precision, smoother surfaces, and thinner walls.

Aircraft designers have been calling for larger castings which tend to become more and more complex. So far, Western foundries have had relatively few markets large enough to justify mass production methods. Some experimentation is going on currently in shell molding of brass.

Activity in non-ferrous foundries generally started at a high level and continued through the summer. By the time seasonal fall dullness developed, most plants already had dropped extra shifts or reduced them sharply. Observers doubted that by the time the anticipated first-of-the-year pickup developed, there would be much overtime put in.

Shortages over

Order backlogs have melted away. Jobbers and dealers in most lines have let their inventories go down and display no disposition to rebuild them, a sure sign that shortages are over. With plumbing goods, for instance, now plentiful and available promptly through regular channels, the return to normalcy appears to have arrived.

Aircraft business had tapered off perhaps 10% to 20% at year's end, but inquiries and quotation requests from other sources were picking up. In the Northwest, some architects are specifying curtain walls using aluminum panel construction, perhaps forerunner of a growing market, although the West so far has few skyscrapers. Alcoa is expanding its Vancouver plant by addition of extruding facilities to the wire-rod-bar-cable mill.

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IT COSTS A FEW CENTS MORE PER GALLON, BUT WITH THE SCHULTZ-O-MIZER WE'VE SUGGESTED YOU'D ACTUALLY USE LOTS LESS OIL.
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FARM MACHINERY AND EQUIPMENT—

National representation practically complete. Decentralized manufacturing should increase

WITH THE ACQUISITION of the Be-Ge Manufacturing Co. at Gilroy last fall by Oliver Corp. of Chicago, six of the seven national full line farm equipment manufacturing corporations now own and operate West Coast factories, each employing from 50 to 350 production workers.

Farm equipment manufacturers' total shipments from the eleven Western States for 1952, according to the Bureau of the Census summary, totaled $52,528,000, representing 2.7% of all national production. Of the total, $21,028,000 was heavy duty tillage equipment, for 12% of national production.

Except for a few power cultivators and garden tractors, there are no tractors produced in the West. Tractors and their parts represent practically 50% of all farm equipment production nationally.

Since the eleven Western States now absorb from 15% to 20% of all farm equipment sold, the decentralized manufacture of farm machines, implements and component parts, and regional assembly thereof should substantially increase in the Far West during the next decade.

Farm machines and equipment
Complete units, attachments and parts
MANUFACTURERS' SHIPMENTS, 1952
PACIFIC AND MOUNTAIN STATES
(U. S. Bureau of Census)

	Value in thousands of dollars
Plows, listers, harrows, rollers, pulverizers and stalk cutters	$21,028
Cultivators and weeders	4,609
Sprayers and dusters	3,992
Harvesting and haying machinery	7,744
Tractors for farm use	4,053
Machines for preparing crops for market	1,795
Poultry and dairy equipment	1,711
Elevators, blowers, wagons, trucks, etc.	3,141
Miscellaneous farm equipment	4,455
TOTAL	$52,528

DIE CASTING—

Western market is stable and future looks good for this newcomer in non-ferrous field

STABILITY of the jobbing die casting industry in the West, despite ingot price fluctuations, end-use limitations and curtailments in the nonferrous metal field, is demonstrated in tonnage statistics, according to the Pacific Coast Group of the American Die Casting Institute. They also give great promise for the free market that lies ahead.

These approximate figures, based on available data, are for the eleven Western States, and do not include the captive die casting industry producing parts for the owner-company as an integrated department.

Die casting
in thousands of pounds

Year	Zinc	Aluminum	All other metals
1950	7,500	6,250	1,200
1951	6,500	4,800	1,100
1952	5,600	6,500	1,000
1953*	5,700	5,100	1,000

*January through September only.

Die casting, a comparative newcomer in the metal trades, has risen to a position of major importance in the non-ferrous foundry field. Some of the factors contributing to the growth of the die casting industry are:

1. Flexible, high rate-per-hour production to meet changing marketing requirements.

2. Lower cost per unit, considering reduced secondary machining operations.

3. Improved product styling resulting from better finish and finer detail.

4. Constantly improved casting quality due to engineering, metallurgical and mechanical advancements.

5. Expanded capacity of the die casting process as effected by improved equipment and know-how.

6. Interchange of technical information within the membership of the American Die Casting Institute, the national jobbing die casting industry organization.

TOOLS AND DIES—

Volume of work unchanged from a year ago. Shops installing new and much-needed equipment

THE TOOL and die situation in the West, as far as amount of work is concerned, has not changed much from a year ago. The large shops with the large equipment are reported as having plenty of work, although the backlog is not too great, but many of the small shops seem to need work. This is not considered serious, as the outlook is encouraging for 1954.

In the Southern California shops most of the work is airframe, with some missile, electronic and rockets. Tolerances are getting closer, if anything; where the shops were working in the .000, they are now working in the .0000. This does not mean that all tools and dies are that close, as there seem to be several large programs in the large assembly jigs still working in the .000 and also fractional, although these major jigs are usually built to masters, which eliminates much jig boring and that type of equipment.

New machine tools are much easier to purchase than a year ago, and many of the shops are getting in new and much-needed equipment, such as boring mills, jig bores, milling machines, lathes and grinders.

Apparently the situation for skilled help has eased off, due partly to more apprentices coming up.

The Southern California Tool & Die Association reports that the new sound movie made by the National Tool & Die Association, covering tools and dies in the making and also part of the tool and die apprentice course, is in demand and still available for use.

SAWS—

Growth of saw shops indicated by formation of association to serve educational needs

INDICATIVE of the growth of saw shops in the West was the formation last March of the Saw Association of Southern California, consisting of 40 member shops representing more than 300 skilled workmen in this type of service.

Many new trends in sawing and types of blades used for high speed high production cutting have necessitated the use of special machinery and "know how" to sharpen such items as metal cutting bandsaws, high speed metal saws, carbide tipped saws and knives.

MAGNESIUM—

Lower consumption of alloy ingots for castings reflects less requirements by aircraft plants

MAGNESIUM fabrication on the West Coast is limited to casting operations. Sheet and extrusions are all supplied from Eastern sources.

Consumption of magnesium alloy ingot for castings during the first three-quarters of 1953 was somewhat below the same period in 1952. This reduction reflects somewhat less aircraft requirements.

Magnesium castings are supplied by 14 West Coast sand foundries, three permanent mold foundries, four die casters, and one investment caster.

ENGINES—

Marked trend toward use of low horsepower diesels is reported in various fields

DURING 1953 there has been a decisive trend toward the use of low horsepower diesel engines in both the original equipment market and in the agricultural, marine and auxiliary fields. There has not been so much activity for the manufacturers of big diesels in the West.

In 1952 a total of nine manufacturers located in California, Oregon and Washington shipped internal combustion engines valued at $8,100,000. The corresponding totals for 1951 were nine manufacturers, located in the same three states, shipping $9,500,000 worth of engines, according to figures from the Bureau of the Census.

Low horsepower diesel engines with optional assemblies, utilized in centrifugal pumps, generators, etc., are giving consumers savings in fuel costs, dependability and a substantial reduction in fire hazard, and are especially vital in civil defense applications.

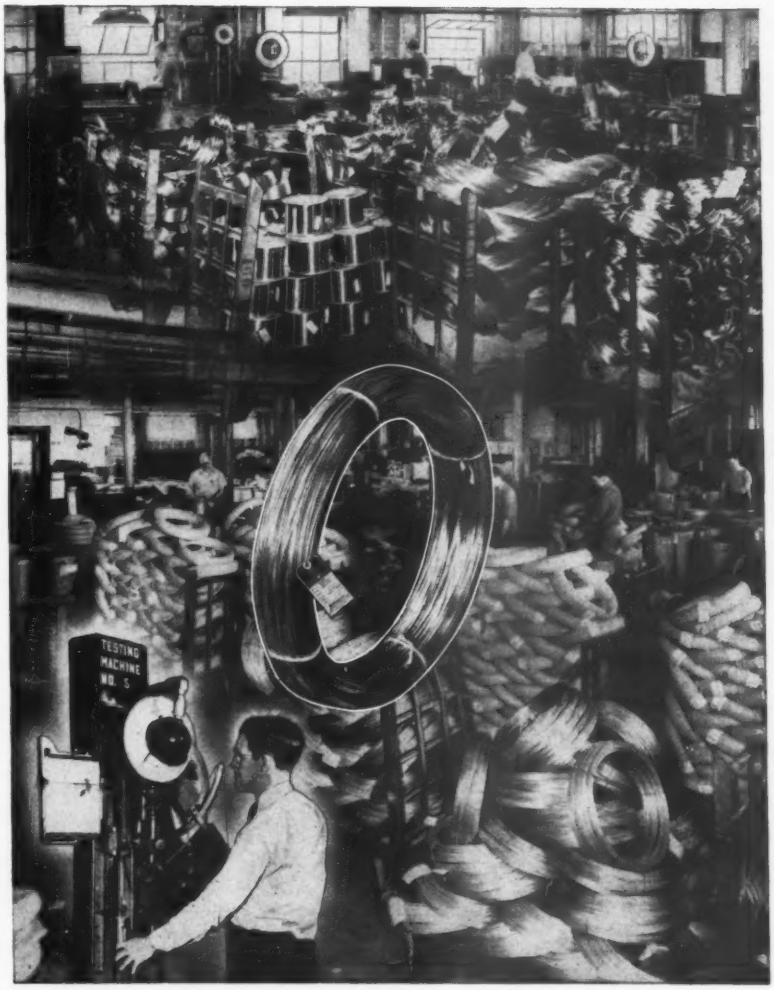
Original equipment manufacturers of mining cars, construction equipment and marine items have been turning to the low horsepower diesel engine as a source of reliable power. Hallett Manufacturing Co., Inglewood, Calif., provides both air-cooled and water-cooled diesel engines in the 5.5 to 30 hp. range. This is the only company in the West making engines in this horsepower range.

MARKING DEVICES—

Sample comparison of months shows slight drop from '52

COMPARATIVE figures on gross sales volume for August 1953, as compared with August 1952, show a slight decline in the West, according to the monthly business survey of the Marking Device Association. This group includes rubber and metal stamps, name and license plates, badges, pressed metal signs, metal seals and hand numbering machines. These figures are:

	August 1953	August 1952	% Change from Aug. 1952
Wash., Ore., Idaho, Mont.	$101,591	$ 97,220	+4.5
Calif., Nev., Utah, Ariz., New Mex.	79,531	83,971	—5.3
Total West (excl. Colo.)	$181,122	$181,191	—.0038



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CAST IRON PIPE—

PRODUCTION IN THE WEST reached a high point in 1951 with an estimated total of 50,000 tons; 1952 and 1953 are estimated as approximately 46,000 tons each year. Another year of good demand is expected in 1954, and through the promotional activities of the Cast Iron Soil Pipe Institute, of which J. W. Struve of Los Angeles served as president for the last two years, increased use of soil pipe for both house sewers and public sewers is expected.

The industry is in the middle of a move to change from the old conventional hand method of production to mechanized foundry production, and the producers on the West Coast have led the way in the national move toward more efficient operation. Sand slinger continuous molding with conveyor handling is the general type of equipment used.

An outstanding achievement last year was the final adoption of the ASA Specifications for Cast Iron Pipe for both water and gas. A significant development is the wider acceptance of mechanical joints; approximately half the output of the industry now represents mechanical joint pipe, and the trend continues upward.

HEAT TREATING—

Field active in the West, particularly in Southern California

APPROXIMATELY 7½% of the total annual billings reported to the Metal Treating Institute from its member companies are from the seven members in the eleven Western States. Six are in California and one in Colorado.

Facts and figures

These figures indicate the following volume from the West:

1953 (estimated)	$2,250,000
1952	2,302,500
1951	1,869,750
1950	955,500
1949	659,250

They cannot be accepted as a trend, since the number of companies throughout the country reporting their total billings varies from year to year, due to growth in membership of the Metal Treating Institute in this period.

The heat treating field has been very active in the West, particularly in Southern California, with heat treaters increasing their facilities and suppliers of furnaces correspondingly active.

SHIPBUILDING—

ONLY TWO large ships were built on the Pacific Coast during 1953, the *Golden Mariner* and the *Evergreen Mariner*, at Bethlehem Shipyards, San Francisco. These high-speed freighters are the largest ships built on the Coast since World War II.

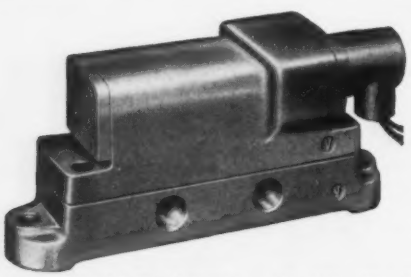
Pacific Coast Engineering Co. of Alameda, Calif., built a number of large oil barges and steel tugs during 1953. The barges are the largest that have ever been built on the Coast up to this time.

Colberg Shipbuilding and Stephens Bros. Shipbuilding of Stockton, Calif., are finishing up some contracts for minesweepers for the Navy.

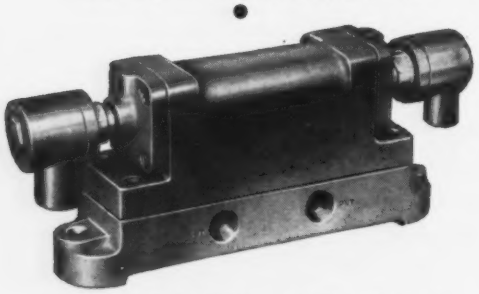
A good deal of conversion and repair work is being done in the San Francisco Bay area, principally by Plant Shipyard Co. in Alameda. Moore Shipbuilding is currently working on a ferryboat contract for San Diego and Coronado, Calif.

In Portland the Willamette and Albina Shipbuilding companies are building some small boats and doing a brisk business in the fields of repair and conversion.

Shipbuilding in the past few years has been trailing off and will continue to do so throughout 1954.



NOPAK Model "V" Type AR, 4-Way Pilot Operated Slide Valve. Unbalanced piston shifted by energizing a normally closed 2-way solenoid pilot.



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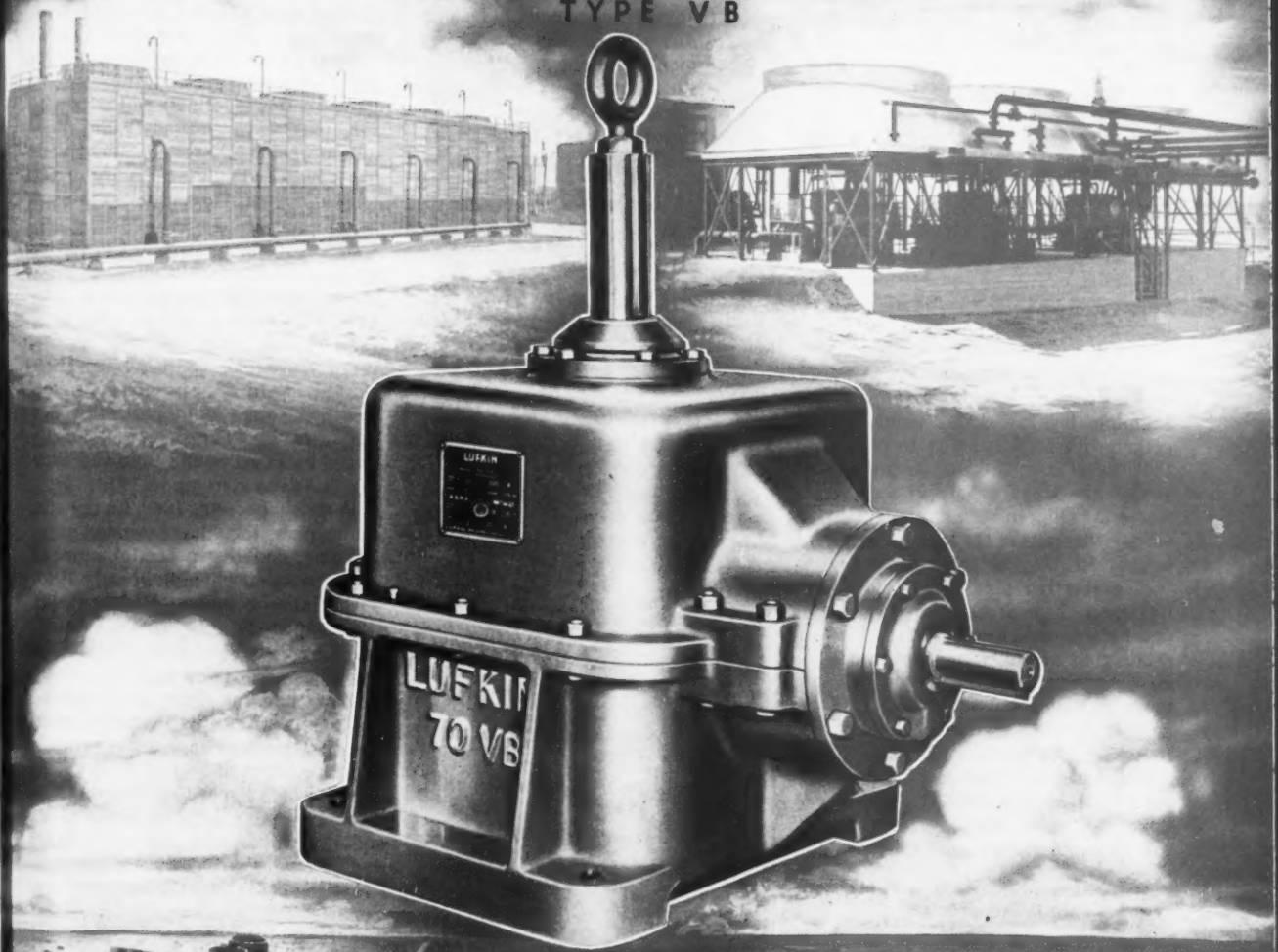

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BULLETIN G-2

MEMBER OF AGMA

LUFKIN FOUNDRY & MACHINE COMPANY LUFKIN, TEXAS

PULP & PAPER PRODUCTS—

Utilization of waste lumber, veneer improves. Better forestry practices are boosting yield

THE APPLICATION of good forestry practices and increased waste utilization characterized the Western pulp industry during 1953.

A dwindling supply of easily accessible virgin timber has changed the methods of procurement of pulp wood in recent years, and a growing percentage of the industry's total wood requirements is being supplied in the form of chips from lumber and veneer mills. Twenty-five per cent of the wood for Washington's pulp comes from lumber mill wastes that would otherwise be burned.

The effect of this trend is to lessen the drain on forests and broaden the wood supply base for the industry, insuring adequate supplies of raw materials in the future. The industry has also managed to get closer utilization of the trees it cuts. In stream bank shipping, logs are being banded together with steel banding to prevent the loss of any sinkers. In order to stretch the wood supply in the mill, whole log chipping is being practiced to save that part of the log usually lost in sawdust.

The Western states have steadily increased their production of paper and paperboard. From 1929 to 1952, production of paper and paperboard increased from 859,000 to 2,483,000 tons, and Western output as a percentage of U. S. production jumped from 7.7% to 9.4%.

Weyerhaeuser Timber Co. has developed a combination veneer-paper box and new and improved techniques of manufacturing are constantly being developed.

Shift in manufacture

The decline in production of unbleached kraft paper in 1953 as compared with 1952 was the result of a shift of West Coast machines from unbleached kraft paper to bleached kraft paper. No new paper machines were built during 1953 and all machines were scheduled for full operation throughout the year.

The formula for one ton of finished kraft pulp calls for: 2.6 air dried tons of wood chips, 130 lb. of salt cake, 55 lb. of lime, 95 lb. of burnt lime, 20 gal. of fuel oil, 220 lb. of chlorine, 75 lb. of caustic soda, 18,000,000 Btu. of steam, 535,000 kwh. of electricity and 65,000 gal. of filtered water.

Washington in 1952 produced more pulp and paper products than any other state. There are now 33 primary pulp paper mills in Washington and Oregon, plus many converting plants which take pulp and paper and fashion it into trainloads of specialty items: frozen food containers, envelopes, paper twine, automobile seat covers and corrugated paper cartons.

The market for paper cups and containers continues to expand steadily with the growth of food packaging, the rapid acceptance of take-out meals from restaurants, and the constantly growing public awareness of sanitation in food service.

Producers of envelopes expect approximately a 5% increase in output for 1953 over 1952. The Europeans have developed some new envelope manufacturing machines and it is expected that there will be a trend toward these models, with some alterations, during the next 3 to 5 years. This trend should result in higher productive speeds, with the successful conversion of lighter weight papers for envelope manufacture, and an extensive increase in the use of analine style inks and envelope printing.

For the past 25 years the eleven Western states have constituted a better than average quality market for envelopes.

Production of unbleached kraft paper in the 11 Western States

(From Kraft Paper Association, Inc.)

Year	Production (tons)
1952	305,200
1953 (partly estimated)	291,000

Production of paper and paperboard 1949-1952

(From American Paper and Pulp Association)

Year	tons
1949	1,798,882
1950	2,149,803
1951	2,501,593
1952	2,483,232
1953 (Est.)	2,600,000

Paper and paperboard produced in the 11 Western States

(tons)

	1952	1951
TOTAL		
Oregon	581,762	574,870
California	758,597	748,415
West	2,483,232	2,501,593
PAPER		
Washington	748,002	778,728
Oregon	409,654	408,785
West	1,189,004	1,228,677
PAPERBOARD		
Washington	263,933	294,152
California	535,407	521,217
West	978,187	970,504

Western expansion

Expansion in Pacific Coast firms has been vigorous during the past year with Weyerhaeuser bringing in a new 250-ton bleached kraft pulp mill in Everett, Wash. The company also started up a 200-ton bleached kraft paperboard mill in Longview, Wash.

Scott Paper Co. is expected to start up its biggest tissue machine of the industry this month. It will go alongside the 1951 acquired Sound View pulp property in Everett. Sound View has a bleached sulfite capacity of 600 tons and a second tissue machine is being planned.

West Tacoma Newsprint Co. started up its second newsprint machine since the war and production began in mid-1953 with 100 tons daily.

Ketchikan Pulp and Paper Co., Ward Cove, Alaska, is about three months ahead of schedule on a new bleached sulfite pulp mill with 300 tons capacity. The pulp mill, partly owned by Puget Sound Pulp and Timber, is due to start up in 1954.

Potlatch Forests, Inc., Livingston, Idaho, plans to add an extended paper machine, doubling potential capacity of the two-year-old mill, in early 1953. The Masonite mill at Ukiah, Calif., has completed a full year's operations and Longview Fiber started up a new machine at Longview in 1952.

Rayonier has completed around 10% expansion of its Olympic Peninsula mills production with the addition of new equipment.

Publishers Paper Co., Oregon City, Ore., has made improvements in its mill that will expand capacity by 4,000 tons annually.

During 1953 Crown Zellerbach Corp. acquired the Canadian Western Lumber Co. and the St. Helen's Pulp and Paper Co., St. Helens, Ore., as the result of an exchange of stock. Crown Zellerbach is also opening two new paper converting plants in California. The San Leandro plant opened during the fall of 1953 and the Los Angeles plant is scheduled to be in operation early this year.

C-Z is planning to install a new soft crepe tissue machine somewhere on the West Coast in the near future. The company has installed evaporating spray-drying equipment in its sulphite plant at Lebanon, Ore., to produce a non-fibrous powder product from paper process waste materials.

FIR DOORS—

Present demand for flush doors dampening panel door markets

THE FIR DOOR market continued to show a decline during 1953, due in large part to the style revolution whereby the demand has shifted from paneled doors to flush doors, and to the tailing off of new home starts after the post-war boom, according to James F. Fowler of the Fir Door Institute, Tacoma.

Manufacture of doors from Douglas fir is an industry peculiar to the Pacific Northwest.

During 1948, 49 and 50, West Coast manufacturers were not able to satisfy the demand for doors and so flush door plants sprang up all over the United States. This was the first major style change in 30 years. These new plants, which require considerably less capital outlay, were easily able to meet panel competition. At present manufacturers of panel doors are still operating at somewhat less than capacity. During 1950, 10,500,000 doors of both kinds were produced for $52,000,000. In 1952, 6,844,000 doors were produced for $41,000,000. In 1952, 33% of these fir doors were flush, the other 67% panelled.

In 1953, production will probably hit 10,000,000 doors, of which it is estimated 60% will be flush type.

FLOUR—

IN AN ATTEMPT to achieve greater cost reduction and more efficient operation, nearly all of the West's flour plants are mechanizing their warehousing by the installation of lift trucks.

Commercial wheat milling production by states, 1952

State	Thousands of sacks	% of estimated annual capacity
Washington	9,562	80.9
Oregon	5,582	81.9
California	5,257	114.3
Utah	4,292	117.5
Colorado	4,197	89.7
Montana	2,762	74.4

Numerous installations are being made in "high-speed" type of flour packers so production can be increased with very little increased effort.

Handling of flour by bulk methods continues to grow in prominence. Several mills in California and the Northwest are now using fiber containers holding approximately 2,000 lb. for shipping bulk flour to bakeries. This reduces the number of units to handle at the receiving end or bakery, and decreases their handling cost per unit.

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LUMBER—

Improved forestry, salvage logging, waste utilization, merchandising campaigns gain acceptance

SINCE 50% of our Western forests are government owned, and the other 50% are owned by the larger timber companies, small and moderate sized users are forced to buy government timber. Year by year, government contracts have become more difficult and these smaller operators have been placed in the uncomfortable position of having little control over their raw material source.

Among the drawbacks of a good deal of the timber put up for sale are the following: (1) undesirable location; (2) strong competitive bidding which forces up the price; (3) an excess of road building, and (4) unnecessarily high standards for road construction.

Forestry practices

A forestry survey for reviewing the American Forestry service and establishing realistic land policies and forestry methods has grown out of the fourth American Forestry Congress held last year in Washington, D. C.

It is believed that this survey, to be carried on in 1954, will show that:

1. There is a great deal more timber in the Pacific Northwest than was originally estimated.

2. There is even a greater amount in California than was previously estimated.

3. California is the No. 2 state in volume.

4. The growth of released Douglas fir which exhibits accelerated growth due to removal of the virgin timber approaches that of Southern pine and is a great deal more than most people suspected.

Reforestation and the tree farm movement have been gaining considerable momentum during the last year. Private industry has led the way and tree farms are no longer a novelty.

Forestry, the science of managing forests for continuous production of wood, has finally become the accepted practice in the woods because it is now the only economically feasible operating method. Of course, some aspects of government forestry and the cutting practices of very small mills on private lands still lag far behind in this respect, but the government is expected to revamp some of its policies in the not too distant future.

At the present time private industry is leaving approximately 25% of its merchantable trees uncut, in a diameter range of 20 to 36 in. On the other hand, cuttings on government lands leave around 55% of the timber. This is stipulated in the timber contracts and is intended for future cuttings. Comparisons, however, have shown that private timber is not only growing faster due to the greater release and added sunlight and water, but in a period of five years will grow a larger volume than the timber left on identical plots harvested under government contract.

Research

Of interest to the chemical industry is the increased research on the control of rodents and brush during 1953. Spearheaded by private industry, there was also a good deal more range and multi-use forest planning. Private industry has discovered that although all of its land cannot be utilized as multi-purpose forest, there are certain areas that can profitably be turned to grazing of sheep and cattle. During the past year forestry practices have become increasingly evident as their feasibility becomes more apparent.

Salvage logging

By far the greatest problem facing Western lumbermen today is that of utilizing over-ripe, over-mature and dead trees. There was an estimated loss of 3 billion to 4 billion board feet due to these causes during the last year alone. Until government contracts make it possible to "salvage-log" on over-mature lands without a great deal of red tape, this loss will go on.

Virtually all private landowners are practicing salvage logging at the present and it has been found profitable to remove as few as one or two trees an acre. Intensive salvage logging, promoted by private industry, serves to clean up the forests by reducing the hazards of fire and insects as well as release young trees for more rapid growth. The industry is completely sold on the many benefits of salvage logging and it appears that the government will probably, within the next year, modify timber contracts so that the relatively small owner can profitably salvage-log government lands.

Lumber prices began to drop slowly in 1952 and then held quite well during early 1953. Prices began to drop off a little more sharply in the latter part of the year and it is expected that prices for 1954 will depend upon such things as (1) the amount of lumber shipped in cut-rate from Canadian sources; (2) lumber merchandising and market development; (3) the number of small operators that drop out of the lumber market; and (4) coupling of lumber production more closely to lumber demand.

In the past year, production in the fir, Western pine and redwood regions has been nearly up to the peak of 1951. Demand has been very high and there has been a thin differential between production orders and shipments. However, toward the end of 1953 over-production was becoming more evident, and some sort of an adjustment of market facilities and production will be necessary to maintain or raise the price for 1954.

A great deal of progress has been made during the past year in end and side gluing, tree farms, reforestation, public relations and education, salvage logging, merchandising and waste utilization. No new mills of any size were built in lumber areas of the West during 1953 and it is unlikely that any large mills will be built this year. At least, no new mills will be built under the present price structure, present timber supply and present government contracts.

Merchandising

The National Lumbermen's Association is conducting a national survey to improve merchandising and further develop existing lumber markets. This increased effort for promotion and merchandising comes as a result of the intensive competition that has encroached somewhat on traditional lumber markets. Medium and large sized plants will largely discard their burners as closer utilization of waste materials is made and the market for chips, hardboard and fuel increases.

Promotion by distributors during 1953 has included an attempt to move certain species which have previously had little market appeal. Primary example of this effort is the promotion of white fir. This wood, previously considered practically a weed tree, is now recognized as a valuable structural material.

Increased time and money are being spent to educate the public on the use of short and odd-sized pieces. Distributors are also promoting the sale of large boards made from small ones by end and edge gluing processes. 1953 saw the greatest efforts to date in mar-

keting, and an increased number of forest products.

Competition has been felt keenly in some areas from the influx of Canadian timber. Some of this lumber, sold at around $10 less per thousand board feet, has tended to depress prices.

Sawmill machinery

There is a definite trend in the use of sawmill machinery toward carriage cutting of timber. Trends are away from steam carriages and toward diesel and electric powered carriages in the larger mills. The popularity of air-operated shot-gun feed for small mills continues.

In the last several years there has been a trend toward conservation of power. In-plant generation of power is growing less popular, with more plants tying in to local power lines. This trend is due partly to the flexibility of steam power and partly to the growing value of wood waste chips for other purposes.

Trends in power transmission equipment indicate a preference for herringbone reducers in large mills, while gear motors still operate successfully in the small ones. A torque arm reducer has become increasingly popular, particularly in small mills, during the last year, with a belt drive for further reduction of power.

Conveyor power and types of conveyors have shown no particular trend. There is very little standardization among mills in this respect; however, a little more rubber belting is creeping into the mills, replacing some of the chains and roller conveyors.

Economical mechanical barking is still somewhere in the future. A small number of mechanical barkers, operating on a number of principles, have been set up in the last few years and it is generally agreed that the industry could use many more. At the present time, however, hand barking is in most cases cheaper. Another labor-saving device that has crept into the mills is the equipping of green chains with roller tops so that lumber can be slid off into piles or onto trucks more easily.

One of the most obvious trends in carriage cutting of lumber is the change from boss dogs to tong dogs. The latter reduce destruction and offer a more secure grip on the log. Boss dogs do the logs more harm than a good sawyer will using a Hill-Nigger log turner.

Another trend appears to be toward riderless carriages, particularly in small mills. Carriage riders are scarce and expensive. The trend in carriage setworks appears to be toward motor driven works. These cut approximately 1,000 lb. of weight off the carriage as compared with electric works, and in the long run are cheaper.

Many small and moderate size mills have found it cheaper to do their log cut-off operation with an ordinary chain saw. The circular saw is still standard equipment, however, in large mills. It has been found that if possible it is far better to do the cut-off on the mill deck so that the log can be more carefully inspected. However, there are still some in-the-pond cut-off systems being replaced.

Manganese chain is being used almost exclusively on log conveyors for hauling from pond to deck. This rivetless roller chain was found to be a great deal more durable than steel. Large gear boxes have replaced the old open gear works for driving log conveying equipment.

Mill construction

Construction of mills with steel frames has far outstripped the building of wooden mills. Large mills originally built of wood are being slowly replaced with steel underpinnings. It has been found that steel framed mills can be put up for about the same price as wood mills and in comparison last virtually forever. However, there is a considerable amount of resistance, so

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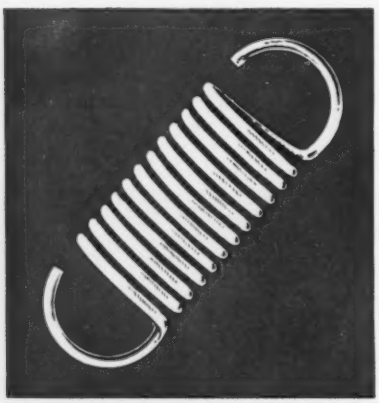

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LUMBER—

. . . Begins on page 100

that progress and redesign of mills and mill machinery is necessarily slow.

A number of the newest mills are being put up on concrete slabs which have the great advantage of being impossible to burn up. It is predicted that more and more mill construction will be on concrete, as in many cases it is not necessary to insure the whole mill under this plan. Present insurance costs in wooden mills range from 50¢ to $1.50 per thousand board feet of cut.

More and more producers are installing machinery to utilize, gather and convey waste materials. At the present time a mill has to cut at least 100,000 board feet per year to make utilization or salvage worthwhile. The milling of lumber is really a large materials handling job. Most of the effort in mill streamlining is toward obtaining easier handling and better flow.

At the present time, mill operators can afford to ship chips about 100 miles to a pulp and paper installation although some go as many as 300. Any further hauling eats up the profits in high freight rates.

No new mills to speak of have come into the Douglas fir region during the last year and approximately 250 small mills have shut down. Ten to 20 medium sized mills have also closed down during the year and several of the very largest mills have gone onto a four-day week.

Redwood region

The California Redwood Association reports the redwood market is spreading out gradually year by year. Redwood now accounts for nearly 3% of the total softwood production. During the past year there has been a trend toward conservation and forestry practices both in the woods and in management thinking. The tree farm program is slowly growing, with 20 farms in the region thus far.

Waste utilization has improved during the last year with redwood chips being shipped to Fiberboard Products in Antioch and Masonite in Ukiah. Utilization of bark has increased, particularly at Pacific Lumber Co.'s Scotia operation. Edge and end gluing has seen more widespread approval during 1953, as has the merchandising of short stock and odd lengths. The three major timber species in California in order of the volume of the 1953 cut are: (1) Douglas fir; (2) Pondersoa pine; (3) redwood. The Redwood Association estimates regional 1952 redwood production at about 869,000,000 fbm. Partial results for 1953 indicate approximately an 11% increase over the previous year.

CONSTRUCTION—

DOLLAR VOLUME of all types of construction in the eleven Western States for 1952 was $3,311,586,000. For 1953 the figure was $3,160,414,000, a drop of $151,172,000. Although a 2% drop in construction starts of homes, public buildings, etc., is expected for the nation as a whole, the influx of population into the West seems to indicate that new construction will continue at a fairly high level.

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HARDBOARD—

Six year old wood waste using industry is busy working on new market and product development

DURING the past six years the West, and the Pacific Northwest in particular, has enjoyed the development of an important new hardboard industry. Hardboard plants eat up the waste woods from sawmills or veneer mills, creating no additional drain on the region's forest resources.

There are now eight hardboard plants producing in the Pacific Northwest, with an estimated annual capacity of about 340,000,000 sq. ft. This capacity is between 20% and 25% of the United States' capacity and may reach 30% in 1954, according to John B. Grantham, Oregon Forest Products Laboratory. Hardboard production is roughly half that of Douglas fir plywood when compared on the basis of surface measure.

Hardboard, although made from waste wood, is by no means an inexpensive substitute for lumber. Large capital investment is required, considerable process developmental work must be undertaken, and a market must be found for the product. Other high costs which must be met are labor, heating and resins. Hardboards are termed wet or dry process, depending upon their method of production.

At the present time a great deal of research is being done by current producers to build a better board and develop a better market. Research can be divided into two categories: (1) development of a market for an already existing board, and (2) development of a board for an already existing market.

Resin costs

The most expensive material going into hardboard is resin, though it constitutes only 2% to 8% of the board. The average cost of resin is around 20¢ per lb., and approximately 10% of the selling price of the board goes to pay for it.

During the past year a new process machine developed in England was offered for sale on the Pacific Coast. This Bartrev process claims to form a continuous strip production of hardboard rather than the standard 4 x 8-ft. sheets currently made in platens.

The Oregon Lumber Co.'s plant uses bark as well as waste wood and the Cascade Plywood Corp. uses planer shavings as its raw material. The remainder of the hardboard plants use waste soft woods ground into uniform sized chips.

During the past year, Weyerhaeuser Timber Co. has put its new hardboard plant at Klamath Falls, Ore., into operation. This plant uses a Weyerhaeuser-developed dry process.

Considering raw materials available, the hardboard industry should flourish in California. However, the primary problems are to secure enough water to run the wet process plant and to dispose of the waste expellant. Masonite Corp., Ukiah, is currently solving the problem by evaporating the water out of the expellant and then burning it. It is believed that when a dry process that uses less of the expensive rosin is developed, the hardboard industry will be able to move into California.

Association sets standards

With the increasing importance of the industry, a national association has been formed to set up standards for the industry. Future aims of the association are industry-wide research, both on process and market development, and exchange of information throughout the country.

A great deal of competition is contributed by hardboard manufacturers in Sweden and other Scandinavian countries. "This competition is preventing American producers from capitalizing on the growing demand they have invested dollars in an effort to build," said Harold A. Miller, Hardboard Association president.

It is pointed out that Finland, for example, can send hardboard by ship to New York, even after paying duty, less expensively than West Coast producers can transport it overland. Pushed by competition from abroad, domestic hardboard manufacturers are continuing to develop new products, and the Hardboard Association is launching a public relations program to encourage wider use.

Perforated hardboard is rapidly gaining in popularity, as is tongue and groove hardboard wallboard.

Best informed sources maintain that growth of the industry depends upon: (1) increased process and market development to a point where hardboard is the superior material for special uses, and (2) market development to the degree that consumers are aware of the many uses of reconstituted waste wood. It is estimated that the hardboard industry for California is still five to ten years away and that the Pacific Northwest's industry will continue growing although it is natural that expansion will be slower than in the past six years.

SHAKES & SHINGLES—

DEMAND for red cedar shakes of all kinds remains good for manufacturers of the Pacific Northwest. Business in the nation as a whole in 1953 was about the same as in 1952, but the demand for red cedar shakes fell off considerably in California. Increases have been measured in the demand for sidewall shingles in the Atlantic States. The demand in Texas has also slipped slightly.

Fully 50% of shingle production is going into sidewalls, with the roofing counterpart, shakes, taking the other half. Process shingles which came into the market a few years back have found an increasing demand, and the market has been exceptionally good for the past six years.

The hand-split shake, which has been in such demand for Western ranch type dwellings, is doing well in spite of the slackening off in California. This item is the choice of architects where price is no deterrent. Hand-split shakes are the best looking and make one of the soundest, longest lasting roofs of any shingles or shakes produced.

Only a few new manufacturers have come into the picture, as the market is fairly well saturated.

Processed shingle

The processed shingle, one with grooved sides and retrimmed edges and butts, is competing very well with the other building materials for sidewalls. Shingle manufacturers believe that substitute products have made very little inroad into the shingle market. In fact, the Red Cedar Shingle Bureau maintains that shingles have cut into the market of some other building materials. Their point is strengthened by the fact that a number of sidewalling materials are endeavoring to create the same style and effect as that done by shingles.

All red cedar shakes and shingles in the country come from the Pacific Northwest and British Columbia.

FURNITURE—

New materials, Western design and styling help meet tough competition from South and imports

DURING 1953 West Coast furniture business suffered severe losses. The industry is suffering from over-expansion at the end of the war and rising labor costs. About $50,000,000 worth of furniture was manufactured in the Pacific Northwest in 1953 while the figure for the Los Angeles area was about $250,000,000.

The Southeastern United States manufactures 45% of the nation's furniture with labor costs averaging around $1 per hour. The Pacific Northwest produces 2% of the nation's furniture production at an average labor cost of around $1.85 an hour.

Present existence of the Western furniture manufacturers is due to the high degree of specialization and concentration on highly stylized Western furniture, and many manufacturers are increasing their service facilities in an effort to increase profit margins.

Western furniture manufacturers face competition from Western prisons, Southern manufacturers and imported Japanese furniture. All three of these sources build furniture at greatly reduced labor costs.

A number of plants have gone out of business during the last year, with failures reaching their highest levels of the decade. The industry in the West has tightened its belt and through drastic cost reduction and a high degree of stylizing is able to maintain certain sections of the Western market. A number of Western manufacturers have turned distributor for Southern and Eastern furniture concerns.

Market drop

In 1950 the West produced 7.6% of the nation's wood furniture. This dropped to 5.9%, in 1952. In 1950 Western manufacturers supplied 11.7% of the nation's supply of upholstered furniture. In 1952 this dropped to around 10%. This is a greater drop in market in two years than the industry had suffered in the previous ten years.

Northwest furniture manufacturers are highly unionized while this is not true of the majority of their competition. Union scale for woodworkers is $1.75 per hour and for upholsterers $1.90.

Variety of materials

Western furniture manufacturers worked with a great variety of materials in 1953 as new influences in home design and styling created new patterns of consumer demand. Most noticeable trends were: (1) Use of textures, such as cloth, fiber, plastic and metals as highlights of furniture; (2) strong demand for provincial and maple furniture, second only to the "contemporary" as style leaders; and (3) a vogue for wrought iron, new pressed woods, and laminates.

Chairs molded from plastic and fiberglas illustrate an experimental tendency in the industry. Western producers introduced such novelties as use of polished brass for legs and trim, and such oriental overtones as splayed feet, overhanging box-like tops, and open, airy cabinet work.

The new styles, patterns and colors in furniture are made to fit the mode of living. The trend is to one-story

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homes, casual, easy living with less and less work on upkeep. Furniture is being scaled down to give the illusion of being lighter and sectional sofas come in every shape imaginable.

Dual sleep equipment is smartly styled. Dining room furniture is plasticized for easy upkeep and bedroom furniture is functional giving more storage room in smaller spaces. Foam rubber, synthetics, swivel TV and contour chairs complement many decorating ideas.

Mechanized operations

While modifying production methods to suit the new materials, furniture makers sought cost-cutting shortcuts to offset higher labor costs, many of them conveyorizing finishing rooms and otherwise mechanizing as many operations as possible.

Aware of the merchandising value of the "California" and "Western living" themes, a group of West Coast factories established an Eastern beachhead in Chicago's Merchandise Mart, creating a year-round "California Corridor" to reach Eastern buyers who do not attend Western furniture market shows.

The year was spotty; the public bought carefully, but appeared quite willing to pay somewhat more money to get better quality. Failures reached their highest levels of the decade. Collections were sluggish and many banks and finance companies pinched down on installment paper, considerably limiting the working capital of smaller concerns.

Despite continued home-building at near-record levels, the business of equipping these homes did not keep pace. No one could say how much buying was being postponed in favor of new car and TV purchases.

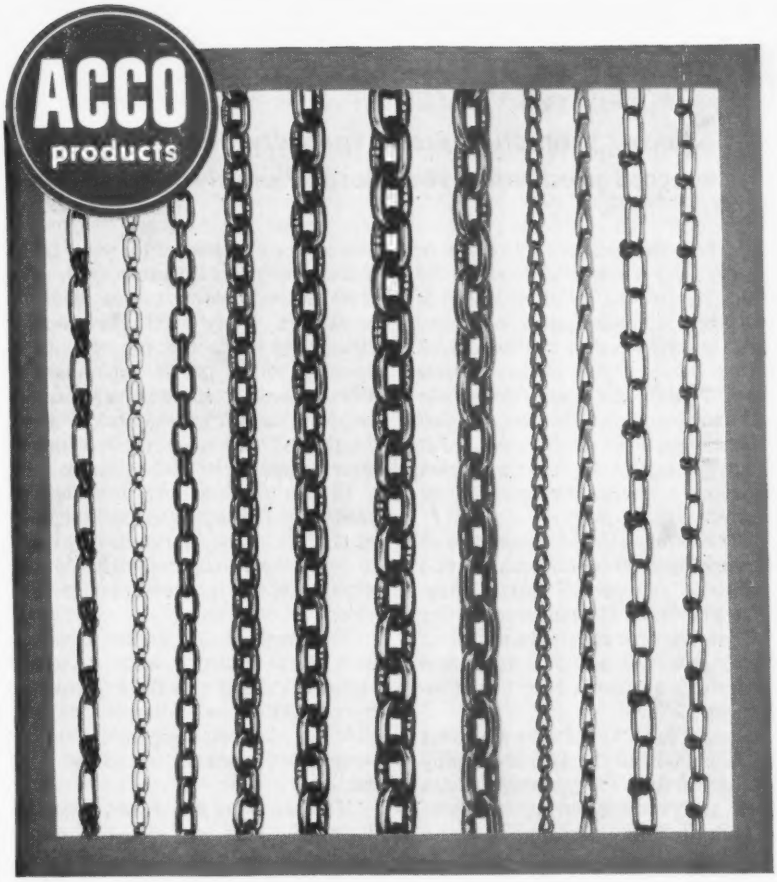
TEXTILES—

AN IMPORTANT apparel industry and several highly successful manufacturers of swim suits, sweaters and woolen shirts constitute the best known section of the West's textile industry.

Synthetic and silk woven goods finished in California in 1952 totaled 19,675,000 lin. yd., according to the Census Bureau, compared with 16,338,000 in 1951.

California has 11 cotton carpet manufacturers with an annual production of 1,500,000 to 1,750,000 sq. yd., according to a survey made by *Retailing Daily*.

A mill to produce cotton goods for state institutions is being installed in San Quentin Prison, California.



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The same thing applies to the weldless chains. Take the two stamped, flat link chains: the safety chain near the left, and the sash chain near the right side. One has only to keep something from being lost; the other must carry weight and run over a pulley. Alike in looks, yes—but that's as far as it goes.

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PLYWOOD—

Heavy promotion work, specialty items yield record production year despite unruly market

TOTAL production of Douglas fir plywood is expected to reach 3.5 billion sq. ft. for 1953, 17% ahead of last year's 2.9 billion sq. ft. and more than two and a half times the output during the first year of peace after World War II. The year's figure is the fifth consecutive all-time high. Total industrial capacity is now estimated at about 4 billion sq. ft., and the market evidences a continuing capacity for expansion.

The West now has 87 factories, with two new Oregon factories coming into production during the year. Thirty-eight plants in Oregon account for 45% of the production, 36 plants in Washington account for 45% and California's 12 plants turn in the remaining 10%.

Gross sales of the industry are about $300,000,000 and the 87 mills employ a force of around 13,000 people. Activity in the industry during 1953 was characterized by more emphasis on specialty products rather than standard grades and by the most aggressive industry-wide merchandising and sales promotion effort in the history of Western plywood.

Specialty products

Production of overlaid plywood used on applications requiring special surface qualities, such as high abrasion resistance and good paintability, increased during the year. The 1953 production of panels with resin-impregnated surfaces used for concrete forms, railroad cars, cabinet work and other applications approached 32,000,000 ft. Production of Plyron, a hardboard surface panel with other specialty uses, will reach an estimated 5,600,000 sq. ft. The outstanding development in special products was Texture One-Eleven, an outdoor building panel designed to open volume markets for exterior fir plywood for siding of homes and buildings.

During the year plywood sales had their ups and downs. The year opened with a rush of business that sent new orders for plywood to then unprecedented weekly highs for several consecutive weeks. Production responded and ran well over 65,000,000 ft. weekly. In late spring and early summer new business fell off, partly due to normal seasonal variations in demand, and partly in reaction to heavy buying during the first part of the year. Some mills announced cutbacks from production, went down to one shift, or worked a 4-day week. Inventories dropped in warehouses throughout the country, and the pressure on mills continued through the summer months until the market broke in late August. By the end of October, plywood prices were at the lowest ebb since the war.

In early November new orders picked up and shot to an all-time high of 113,000,000 sq. ft. for the first week of November, compared with a low of 42,000,000 sq. ft. a few months previous.

The involved distribution mechanisms of the industry, both wholesale and retail, along with the intra-industry competition, were largely responsible for the year's gigantic fluctuations in both market demand and production.

Merchandising and sales promotion during the year was aimed at retail lumber dealers, who sell about 50% of the industry's output. In 1953 manufacturers invested about $2,000,000 in over-all private promotion and their continuing quality testing program which is the heart of the trade promotion effort. The year's first promotion campaign was keyed to plans for eight fir plywood built-in storage units backed by strong national advertising. Trade buyers and consumers picked up 3,000,000 of these plans, and 18,000 out of 27,000 lumber dealers used the display material that went with the plans.

Built-it-yourself campaign

Pressed by the slump in price during the summer, the industry put up $200,000 for a spot newspaper advertising campaign billing fir plywood as "build-it-yourself" material for all kinds of craft projects and around-the-house jobs. The campaign was particularly successful and one dealer reported his over-all plywood sales jumped 18% during the campaign.

In another campaign the industry joined Post Cereals and Mall Tool Company in a promotion plan bringing "do-it-yourself" plywood patterns to millions of home owners in the final months of the year as premiums in boxes of Grape Nuts Flakes. Also aimed at this segment of the market, which consumes about 3,000,000 sq. ft. of plywood, is a Christmas promotion with plans for 10 holiday projects for home craftsmen.

The first promotional plans for 1954 will be a campaign devoted to selling more plywood for built-in storage, a natural market which is increasing.

A heavy proportion of plywood goes to the broad construction market, and although some declines in this area are forecast, authorities expect 1,000 housing starts in 1954.

The recent change in FHA's minimum property requirements accepting thin plywood sheathing over wide rafter spacing has had a significant effect on the demand for structural grades of fir plywood. In housing construction the pressure of costs favors the use of plywood, because in most instances the in-place cost of plywood subfloors, wall sheathing and roof decking is substantially lower than conventional materials. It is reported that sales in this bracket of construction have jumped 70%.

Although experts see possible declines in heavy construction, remodeling, maintenance and repair, prime outlets for the products of the industry are expected to increase. Another big segment of plywood production goes to the broad industrial market for maintenance, production line installations, signs, tanks, trucks and railroad cars, furniture, boats and other miscellaneous applications.

One of the industry's latest achievements is the development of data proving the strength and adequacy of plywood for large horizontal areas in schools and similar structures which must be designed to withstand earthquakes and hurricanes.

Notable among recent developments in production methods is a portable veneer plant that may be operated in the woods beside the mill. Another is the continuous layup system that no longer forces the layup man assembling panels to duck his head as the face panels are swung into place in the assembly.

Strapping and packaging of both veneer and plywood panels has taken hold during the past year, and the introduction of a patching compound in paste form for filling defects of underlayment stock, previously the cause of sizable volume of falldowns, appears to have possibilities.

Consideration is being given a realignment of plywood grading so that it meets changing market conditions and fits more closely the needs and desires of buyers. Some members of the industry are convinced that within the next 10 years the great majority of all panels will be made with waterproof glues.

PRODUCE CONTAINERS—

Trend toward cartons instead of crates, cellophane bagging, pre-packaging, smaller units

THE YEAR just ended saw probably more changes in the field of containers for shipping Western produce than in any similar period in the past 20 years.

The process of cooling lettuce by vacuum, which started in Salinas in 1948, has materially altered the container picture. This method of cooling, which brings lettuce from field temperature to 33 deg. within less than 30 minutes, makes possible the use of corrugated cartons, holding two dozen heads of lettuce, as no ice is used either in the container or over the load. The result has been an increased use of cartons, and in consequence, a decreasing use of other containers such as wooden crates.

Change in carrots

Another change that reached volume proportions was the method of shipping carrots. This vegetable, which in the past has been shipped with lush green tops, is now swinging rapidly to topped carrots in cello bags shipped in units of two and four dozen. This business is divided between wirebound crates and cartons.

The artichoke, a strictly California vegetable, has for years been shipped in nailed wooden crates with a high bulge. At the start of the present season, it was decided to ship in a half size of greater depth than in the past, with no bulge resulting. The result is less bruising.

Smaller units soon

It seems probable in the near future that broccoli, another vegetable of California origin, will soon be shipped in a smaller unit. The present practice of shipping 28 bunches in a crate is likely to be replaced by packing 14 to 18 bunches. Pressure from Eastern buyers is forcing this trend.

While these container changes have resulted in a confused situation among shippers, suppliers and transportation companies, it is felt that definite goals are being reached which will improve the position of West Coast produce shippers, and the end result will be to get their products through to destination more cheaply and with less damage and consequent loss.

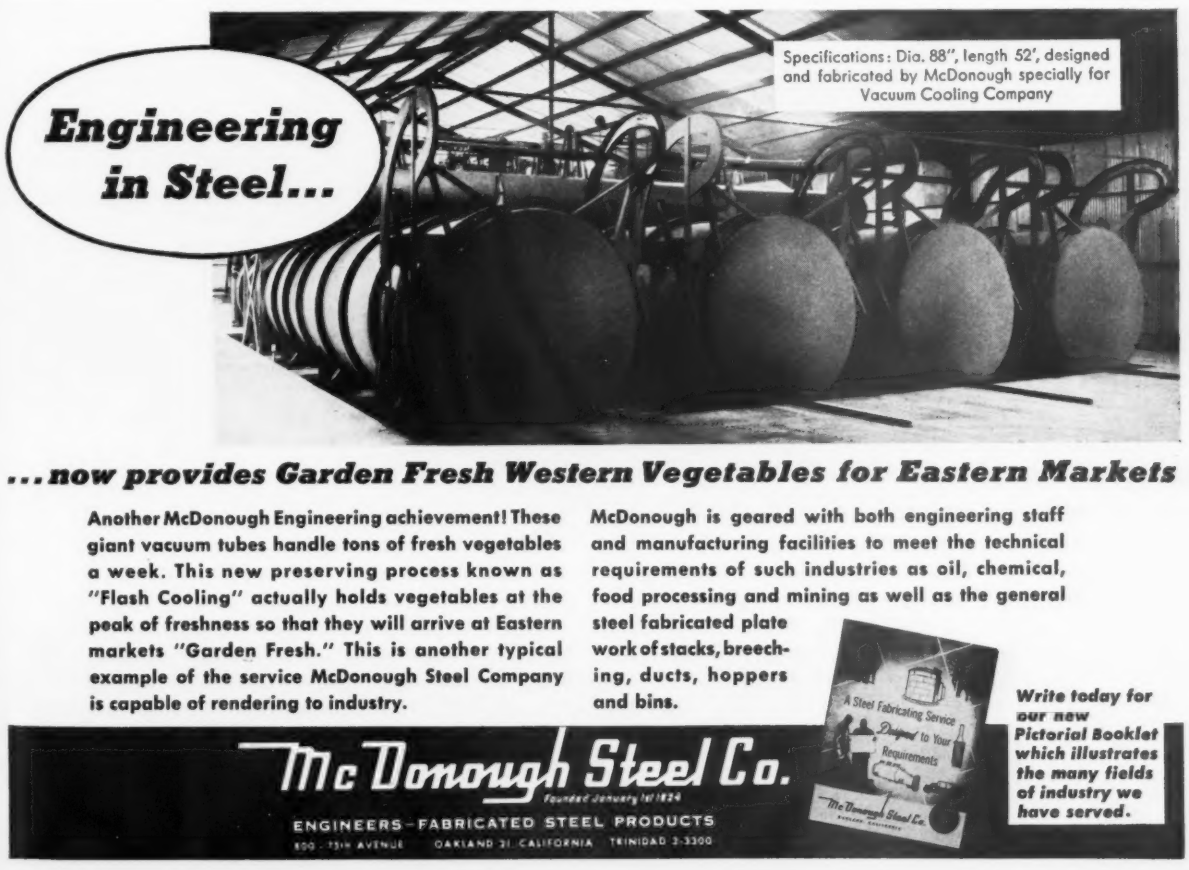
TOYS—

RETURN of "controlled materials" to the availability list sharpened competition in toy manufacturing. Better alloys replaced substitute metals. Plastics continued to gain but vinyl did even better, its use in dolls probably doubling.

Many lines of goods were upgraded qualitywise to meet the public's more discriminating buying attitude. Far from pinching pennies, however, people were spending freely, singling out top-quality items. They simply wanted to be sure of getting their money's worth. At year's end, 1953 sales totals seemed to have remained very close to record high levels.

Frankly shooting for the new market created by the wartime bulge in the birth rate, the industry laid much stress on toys for the eight- to twelve-year-old generation. The spotlight shifted from Hopalong and the space men to a junior version of the do-it-yourself idea.

Best sellers included microscopes and chemistry sets for the boys, cake-baking equipment, refrigerators and similar paraphernalia for the girls to make things "just like Mother does."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CHEMICALS—

Phenol plants opening way for many new chemical operations

THE Western chemical industry's most important step forward last year was to fill its biggest gap, the production of phenol, thus opening the way for many chemical operations based on its use.

Where no phenol had been produced west of the Rockies before, the region now has 35,000,000 lb. of annual capacity. Monsanto Chemical Co. opened its 20,000,000 lb. sulfonation route plant at Avon, Calif., in November, and Standard Oil of California was due to follow shortly with its 35,000,000 lb. cumene-route plant at Richmond.

Another outstanding development is the petroleum refinery center beginning to emerge in the Puget Sound area, resulting from the arrival of Canadian oil by pipeline from Alberta. This relieves the fear of depletion of California's resources, and also paves the way for new chemical industries in the Pacific Northwest.

Standard Oil now does not have to rely on outside sources for benzene for its big output of detergents, with the opening of its platformer plant at El Segundo, Calif.

As agriculture is the most important Western outlet for chemicals, ammonia production has been increasing. Shell Chemical's $10,000,000 plant at Ventura, with 150 tons-per-day capacity, opened in December, making a total of five Western ammonia plants.

The others are Hooker, Hercules, Dow, and Shell (at Shell Point). Brea Chemical (Union Oil subsidiary) will open a $13,000,000 200 tons-per-day facility the middle of the year, and two Utah projects are being planned, by Salt Lake City Chemical Co. and Utah Chemical Co.

Despite the greater use of fertilizers and other chemical products in agriculture, some concern is being felt about the retirement of high-value orchard and field crop acreage to make way for urban expansion.

The home construction field, incidentally, is a market for chemicals that has many possibilities, such as synthetic substitutes for present wall and floor coverings.

Prospective cut-backs in cotton acreage in California and Arizona this year will greatly reduce the amount of Western cottonseed oil and cut insecticide and fertilizer sales.

Western output

Chlorine gas (tons)	1952	1951
West	262,594	284,004
Sodium hydroxide (short tons of 100% NaCH)		
West	226,362	231,044
Oxygen, high purity (millions of cu. ft.)		
Mountain	176	164
Utah	60	60
Other	116	104
Pacific	1,509	1,604
Wash.	122	112
Ore.	108	101
Calif.	1,279	1,391
Total West	1,685	1,874
Acetylene, (millions of cu. ft.)		
Mountain	56	68
Colo.	24	33
Other	32	35
Pacific	288	204
Wash.	107	26
Ore.	29	28
Calif.	152	150
Total West	344	272

Sulphuric acid, new acid (tons of 100% H_2SO_4)	1952	1951	1950
West	951,928	984,075	829,317

BRICK AND TILE—

TOTAL VOLUME of structural clay products for 1953 was almost exactly the same as in 1952, according to production figures for the first three quarters of the year. The 1954 volume is expected to be the same as 1953 with probably some tailing off, not to exceed 10%.

Some manufacturers of certain products such as face brick expect sharp rises in business volume as compared with 1953.

Many optimistic manufacturers are employing an added sales force to boost sales. During the past year Western manufacturers have increased their sales forces by 40%.

For August 1953 the three coastal states showed an increase of 10% over the corresponding month in 1952 for unglazed brick, while shipments over the same period decreased less than 0.5%. The remaining eight Western states showed a 22% decrease in production, while shipments decreased 9%.

"SCR brick" is the first successfully designed through-the-wall unit used in the United States. More than 13,000,000 SCR bricks had been sold by September 1953, after a year's promotion. One trouble with SCR, however, is that it does not allow for any reinforcement within the wall, necessary in any building over two stories. A new brick which allows internal reinforcement and is still a through-the-wall brick has recently been accepted in the West.

CEMENT—

PORTLAND cement has become well established as a building material in the West, as can be shown by the yearly increase in production. Use of concrete blocks for construction made a great deal of headway over both timber and steel during the shortage of these materials and part of this gain has not been relinquished.

1954 is expected to be another good year for Portland cement in spite of the expected recession in home and public building construction.

Among new uses for concrete are prestressed tanks, such as those used by the East Bay Municipal Utility Department, Oakland, Calif.

A firm in Tacoma, Wash., is mass-producing prestressed concrete beams and merchandising its product like lumber. It is expected that there will be mass production of prestressed concrete members of the smaller sizes before too long in the West.

Another concrete product finding increased acceptance is air entrainment concrete. Air bubbles within the concrete help it withstand freezing and thawing, make it more workable, and save sand and cement.

FIBERGLAS PANELS—

WARTIME experimentation with resins and glass fibers has grown into an important new industry for the West. Since the war a number of small firms have entered the field and although some have since disappeared, the industry's success is growing year by year.

Alsynite

Alsynite Co. of America started production in San Diego after World War II of translucent plastic sheeting in corrugated panels. Since then new products developed have included: flat panels, self-extinguishing fire-resistant panels, shower door panels, etc. Alsynite is made from a chopped strand fiberglas mat impregnated with polyester resins and cured under pressure.

Plexolite

Plexolite Sales Corp. product is a polyester resin reinforced with glass fibers. It is a low pressure laminated material, manufactured in flat and corrugated panels. Commercial applications include use as sign backgrounds, window display backgrounds, store fronts, etc. Plexolite's new production process features the first continuous automatic production of polyester resin panels in the industry.

PLASTICS—

THE WEST appears to be regaining its position as a leading area in plastics, after dropping behind during the postwar period. For a time, Western consumption of polyesters was running at about one-fourth of the national usage, in an area which included only one-eighth of U. S. population, but by mid-1953 it was down to the level of the rest of the country.

The shift did not come about because of slackening business, for total U. S. polyester production actually quadrupled during this time, but mainly because of tremendous expansion in the East. Meanwhile many of the small Western fabricators who sprang up during and after World War II were unable to compete favorably for lack of capital.

Significant to the entire industry in this connection was Libby-Owens-Ford's purchase, during 1953, of the Corrulux plant at Houston, Texas. It marked the first entry of big capital into the plastics field.

Industry sources believe 1954 may see the West forge ahead because of a number of factors, notably (1) further increase in aircraft requirements of polyesters in uses where light weight plus unique electrical properties give them an advantage, and (2) a growing market in the construction field, particularly for corrugated translucent panels. Some of the largest producers of these materials are located in Southern California.

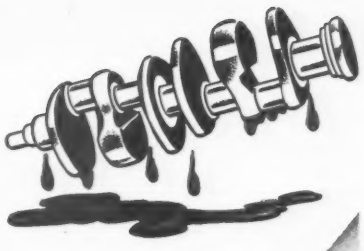
Market in small boats

Another potentially large market is developing in the small boat field, as a material for either the skin or the entire hull. Already this field is being tapped by plants in the San Diego, Los Angeles and Seattle areas, and the Navy is experimenting with polyesters in various types of small craft.

Huge tonnage, of course, could result from the long-predicted advent of the plastic automobile, and the industry is watching closely Chevrolet's new Corvette as the first major-company venture in this field. With growing competition and plenty of raw materials in sight, the industry feels prepared to tackle this market just as fast as automotive makers are ready to develop it.

Use of phenolics in the thermosetting end of the plastics industry increased 25% to an estimated total of 6,000,000 lb. Urea and melamine followed the same trend to a total of 3,000,000 lb. The use of alkyds is starting to grow, although they are still in the minority. The trend in the

YESTERDAY



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thermosetting portion of the industry, which is primarily engaged in the manufacture of industrial parts such as cable connectors, switch parts, wall plates, stove hardware, and electrical insulation, is steadily upward. Increase in volume for 1954 over 1953 is estimated at 5%.

It has been estimated that the West accounts for approximately 15% of the total output of molded plastic parts in the United States, and the area apparently has more plastic companies per capita than any other section of the United States. Because of distance from the main sources of information about the original uses of plastic materials, the West has come up with many new uses.

The fact that two companies which have pioneered the manufacture of raw materials for plastics have made large investments in plants on the Pacific Coast is evidence that the West is regarded as one of the largest producers of plastic parts in the country.

PAINT—

Western sales jump 20% in expanding market. 75% of home owners doing their own painting

WESTERN paint industry sales for 1953 jumped more than 20% above the previous year, while the nation as a whole enjoyed a record year with sales up 6% over 1952 and 1½% over 1951.

Increase of Western paint manufacturers' sales appears to be ahead of the national average by about the same margin that Western home construction exceeds the rest of the nation.

Most of the following is the result of a survey conducted for WESTERN INDUSTRY by John B. Vaughn, regional vice president of the National Paint, Varnish and Lacquer Assn., and president of Sillers Paint & Varnish Co., Los Angeles.

Outlook good

Because of the expected continuance of a high level of new construction in the West and the expected continued increase in population, Western paint manufacturers are looking to 1954 with confidence.

Due to the low dollar value of paint in relation to its weight, it is not economically feasible for an Eastern manufacturer to ship standard commercial paint products to the West Coast. By the same token, it is not generally practical for the Western manufacturer to ship his products beyond the Rockies.

While the Western paint manufacturers have been expanding continually into such areas as New Mexico, Colorado and eastern Washington, it is not practical for them to consider going much further in seeking new markets without decentralizing their manufacturing operations to eliminate the high freight costs.

The Western manufacturer has been handicapped by the fact that very few basic materials are produced in the West. There is a small amount of phthalic anhydride being made, some inert pigments and some glycerin. There are indications, though, that some of the basic industries are coming to the West, as evidenced by the building of a new phenol plant in the Bay Area.

Introduction of water-thinned paints a few years ago created some drop in consumption of linseed oil, but it then leveled out and maintained a uniform volume the past two years. There is still a good quantity of linseed oil crushed on the West Coast, so that freight rates from the East, although figured in the general cost, are not actually paid by West Coast crushers. On the other hand, almost all the soybean oil is shipped from the Middle West or Mideast parts of the United States, and the high item of freight becomes an important cost.

Competition for Government business has intensified to such a degree that West Coast manufacturers, who up till a year and a half ago were successful bidders on more than 50% of all Government contracts, are now successful on only a very small percentage. Contributing to this latter situation are higher prices on raw materials on the Pacific Coast, as compared to other sections of the country, higher labor costs and dock charges.

Big consumer

Fifty per cent of the West's thinner and solvent gallonage is marketed in the Los Angeles basin. The West has shown a steady gain in the sale of thinners and solvents for the past ten years or more and it appears that the demand is still growing.

Every important paint manufacturer has, in the past two or three years, introduced a new line of gayly

colored stucco paints. They range in type from the conventional oil base and latex emulsion and other aqueous systems, to the new controlled penetration flat alkyds.

Western containers

Western producers of containers are expanding into markets now dominated by eastern manufacturers, as evidenced by the new Rheem plant in the Seattle area for the manufacture of drums and paint pails.

There is a well-established trend towards the use of water emulsion paints based on styrene butadiene, polyvinyl acetate and others, but there has been no lessening in the volume of oil base paints in spite of the tremendous growth of these new types. There has been a good increase in the use of epichlorohydrin bisphenol resins for industrial finishes, such as Shell's Epon.

An increase in the use of alkyd resins for making flat wall paints is foreseen and a slow but definite trend points towards odorless types which are already in strong demand in eastern markets. There is still a strong demand for the latex emulsion paints, and some are now being offered for exterior stucco use. They are not yet perfected to eliminate a tendency to fade, soil and chalk excessively.

Demand for the new colorful lasting coatings constitutes a creative challenge to the paint industry in the West. Pigments with improved fade resistance are now available to the manufacturer, enabling him to add new colors to his line of exterior finishes.

One outstanding development in the lacquer field is a pattern lacquer used in moulding operations. It is applied by brush to mahogany wood and is superior to shellac in drying, brushing property, abrasion resistance, color choice, film build, eye appeal and gloss. Hot spray lacquers permitting more material to be applied in one coating are also growing in popularity.

Several new modern paint plants have been constructed within the last two years on the West Coast incorporating new ideas and methods for material handling and production, making possible greater efficiency than has ever been known in our industry. In the planning, thinking and execution of these new ideas, the West Coast has been a leader.

Do it yourself

There has been a decided trend toward the home owner doing his own work. A recent survey showed that 80% of interior painting and 72% of exterior painting is now done by the home owner. Additionally there is another trend toward making paint easier and more pleasant to apply. Paint sales should be increased by a substantial percentage, especially if the "do it yourself" idea or a modified version thereof remains popular.

Materials, processes

Among the new and modified materials now available to the paint industry are isophthalic acid, an isomer of phthalic anhydride, which gives excellent promise of improving the flexibility and durability of alkyd resins.

Considerable work is being done with coatings using polyester resins in order to develop formulations that can be applied in the conventional manner. These should be available within the next year. Outstanding properties of a polyester film are resistance to weathering and chemical inertness, and might well revolutionize the paint industry.

Acrylic resin emulsion paint can be applied in wet weather, salt air or desert heat to masonry structures and give satisfactory service.

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PAINT—

. . . Begins on page 110

for metal are being sold to a limited extent. They are tough, have good adhesion and are resistant to most chemicals.

The epoxy resin base coatings are relatively new and can be cured at room temperature by mixing the catalyst with the coating immediately prior to application. Silicone resins mixed with alkyds produce a new water retardant finish for masonry.

Fire retardant paints are a reality and should be more widely accepted in the future. New test methods to evaluate fire retardant qualities have aided in the research.

Recent development of a chemical to materially reduce the discoloring effect of light on wood makes possible its use in clear finishes for exterior application.

There has been a trend toward new methods of distribution and maintaining inventories resulting from color systems. The sales of paint in the eleven Western States should improve because of the increased population resulting in the need for new homes and new items for the home.

The Aerosol dispenser method of applying paints has been much improved and this type packaging should be in greater demand in the future.

A trend to roller coaters has brought a roller cleaner on the market. It claims to be non-inflammable and non-toxic.

There is a definite trend towards the use of improved textured pigments such as micronized umbers, siennas and natural primer iron oxides. Micronizing improves the ease of dispersion, settling and color strength.

Although approximately 90% of finishes produced for the industrial market are spray applied, a much smaller percentage is applied in the trade sales field due to opposition of the local unions of the American Federation of Labor.

The cost of new housing and commercial properties could be substantially reduced if the archaic brush methods of applying paint were relegated to the comparatively few situations in which new, faster and improved tools which insure greater productivity could not be employed.

Output for the eleven Western States for the years 1950 to 1953 inclusive, is estimated as follows:

	Sales
1953	$4,900,000
1952	4,350,000
1951	4,250,000
1950	3,000,000

Among the new products introduced during the past four years are: improved automatic spraying machines, higher production types of spray guns and air regulators; an improved electrostatic device; an increased use of hot materials, which has led to the development of several types of paint and lacquer heaters; and a process that employs heat and high pressures in lieu of compressed air for the break-up of material.

RUBBER—

Foam rubber continues to blossom with furniture bedding leading the way. Tire market up

THE WEST'S RUBBER industry thrived and expanded in 1953, thanks to a boom in foam rubber, a trend toward silicones in aircraft and toward other special rubbers for an expanding mechanical rubber goods production, as well as new markets in materials handling and in-plant rolling stock. The industry also took steps toward creating a source of highly trained technologists for its future growth in this second largest rubber center in the U. S.

It was a good year. The bellwether replacement passenger tire market showed some 12% higher sales volume. Somewhat less bustling, though up slightly, was the truck tire business, which experienced normal supply conditions for the first time since 1940.

Total U. S. rubber consumption was running at an all-time high rate, up 9% at more than double the pre-World War II usage. Despite fears that automobile output might decline considerably, some industry leaders believe the rubber industry's sales totals may rise slightly in 1954.

The spectacular growth of foam rubber continued. Goodyear at Los Angeles boosted its output 40% and American Latex, leading in tonnage, had to make four successive additions to its facilities, with furniture and bedding representing nearly 80% of the record-breaking volume. New markets were shaping up in seating for farm and road-making machinery, reusable foam mattresses for shipping parts between plants, and packaging for delicate instruments. American Latex during the year took over total production of a nationally marketed private brand, despite high shipping costs east of the Rockies.

Foam rubber factory

A new force appeared in the Western foam field as U. S. Rubber bought a 55-acre tract at Santa Ana and started a 66,000-square foot factory to be completed by early spring. Significantly, it is not now entering the mattress field but is concentrating on foam cushions for the automotive and furniture industries. Industry gossip was that this site might also become the location for the West's second rubber footwear factory.

Reflecting Western industry's ability to surmount unfavorable freight relationships by creating widely wanted specialty products, Kirkhill Rubber reported sales east of the Rockies to have more than doubled since the end of World War II and the company set up a new eastern sales organization.

Voit Rubber also expanded its eastern sales branch, moving it from Chicago to Danville, Ill., where larger facilities for warehousing and future manufacturing have been secured. The sensation created by Voit several years ago in getting its rubber-covered football officially accepted for contest games created a runaway market which in 1953 still kept it heavily backlogged and operating round the clock even during the normal summer slump.

Underwater sports

Additional impetus came from a surprising source—underwater swimming equipment, a market in which Voit was alone in 1950 but which now has some 25 firms competing for a $10,000,000 annual sales volume. Swim fins were a minor novelty until a motion picture dramatizing the work of war-time "frog men" caught the fancy of youth. By two-way tie-ins with sports dealers and movie theaters, Voit helped fan the flame until last year the world output of fins, masks, goggles, spears and allied gear was being produced for more than 100,000 skin divers organized into some 110 local clubs and regional councils from the Great Lakes to the Caribbean.

Looking ahead to further expansion in the West, the industry's Los Angeles Rubber Group put into operation its plan for a Rubber Technology

Foundation to provide a long-range source of specialists in rubber chemistry and process engineering. Jointly with the Foundation, the University of Southern California's college of engineering set up a rubber technology department headed by Dr. Harry Fisher and in midwinter launched evening courses and seminars for undergraduate and graduate training. In 1954 a new laboratory will permit extension of research work.

A trend toward nylon tires, once nearly stifled by the fabric's propensity for stretching, got strong impetus in 1953 with what Goodyear termed "phenomenal acceptance" of its new 4-ply nylon passenger tire. The company solved the stretch problem by a process which stretches the fabric before impregnation. Goodyear also has introduced statistical quality control into tire building to assure tire balance and reduce rejects. Various companies are experimenting with nylon and dacron combinations and 1954 should see a number of new tires introduced for passenger cars.

"Vulcalon" experiments

Most truck tires already are made with nylon and natural rubber, but major companies are experimenting with a new rubber called "Vulcalon," developed in Germany and theoretically capable of 100,000-mile heavy-duty service. Goodyear's Chemigum SL is somewhat similar and is similarly expensive but possesses twice the tensile strength of natural rubber and twice the abrasion resistance of the best GRS tread. GRS rubber meanwhile may be improved by a new type of furnace black with superior resistance to abrasion. Production costs of GRS may be cut by new petroleum products as extenders, reducing total requirements of butadiene and styrene.

The West's regional needs are stimulating new special products for industries such as lumbering, oil drilling and heavy construction. A Hyster company official predicted rubber-tired machines as the next important development in logging operations. A common practice has been towing out a number of felled logs simultaneously with aid of an arch-shaped hoist. Some companies now favor use of equipment rolling on big off-road tires as large as six feet in diameter, claiming that they permit greater maneuverability than tractor treads. For road-building, a dumbbell-shaped water stop is being produced as insert between concrete slabs, to allow for thermal expansion and contraction. Experimentation with rubber-plus-asphalt highway surfaces is continuing.

Goodyear has introduced a hard-rock lug and rib tire made of natural rubber and nylon. U. S. Rubber unveiled its "Innacush" solid tire for industrial hauling vehicles, with soft rubber inside and a harder rubber exterior. It is demountable, requiring no special equipment for a tire change. Tubeless tires have made their debut for airliners. Goodrich is bringing out a heavy-duty truck tire with 5,000 steel claws in its tread to grip snow and ice. It also has developed an important innovation for shippers—an accordion-like pneumatic pillow of synthetic rubber, to be placed between items of freight in trucks and railroad cars, then inflated to tighten the load against shifting en route.

A growing demand has been noted for rubber-lined tanks for handling corrosive materials. This business has tripled in the past two years. A putty-like vinyl plastic known as Geon is being used on Ford's assembly line for weatherproofing, displacing gasket-type stripping. It is shot by spray gun around the windshield and frame, along the trunk and drip guard rail.

Several new compounds have come out for use in high heat forming operations in aircraft. Among them is "Hydrop," brought out by Rubbercraft

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for use in throw sheets, particularly for hot forming magnesium and titanium. Better polymers and better compounding ingredients have improved the quality of slush pump valve seals and packers for oilfield use.

Perhaps the most important trend in the present sizable use of rubbers by the aircraft industry is the part played by the silicones. They seem made to order for jet planes operating with temperatures ranging from flaming heat to stratospheric cold. General Electric and Dow-Corning have brought out new silicone-base polymers for extreme temperatures ranging from —120 to 500 degrees. One GE compound is designed for high strength with flexibility at low temperatures, as required in aircraft door seals and hatch covers.

Since silicones do not adhere to metal, they are valuable for stick-proof valve seats, release agents in molding, and as coating for bakery pans which do not stick to the food. Another compound with greatly reduced shrinkage, extremely low compression set, and no toxic additives, is suitable in food, cosmetic and pharmaceutical industries.

Cost of silicones has come down somewhat, furthering their use in many other industries. The automobile industry is using silicones in spark plug boots and O-rings. Silicones' excellent dielectric properties and resistance to moisture are especially adaptable to transformers and to motors in jobs subject to heavy overloads, such as in rolling mills, grinders, hoists, and as prime movers in production lines and other places where breakdowns and lost time are costly. With Class H silicone insulation, motors may be uprated 50% or more, it is claimed.

FERTILIZER—

California production up 50,000 tons for 1953 as a result of concerted sales promotion work

COMMERCIAL fertilizers sold in California during the first three quarters of 1953 approximated 639,344 tons, as compared with 582,623 tons for the same period in 1952.

The total 1953 tonnage was expected to approximate 800,000 tons, or, roughly, 50,000 tons more than was sold during the calendar year 1952. The industry in California is very proud of this sales record, which has run counter to that of other areas of the country.

The California Fertilizer Association believes that the principal reason for the increased farmer acceptance of commercial fertilizers in California during 1953 is the concerted publicity and public relations campaign which the association carried on throughout the year. This information has been directed to the farmers of the state and has been obtained from impartial sources, particularly the University and the U. S. Department of Agriculture.

The association has hammered on the theme that $1 invested in commercial fertilizer materials will produce an average of $3 or more in increased income to the farmer, over and above his outlay for the fertilizing material. They have also consistently pointed out that use of adequate fertilizers in combination with other approved farming practices will reduce unit cost of production and thus increase net profit to the farmer.

Fertilizers will be in considerably better supply on the Pacific Coast in 1954. New nitrogen plants will be in production at Ventura and Brea, California, in Washington state and at Kimberly, B. C. Phosphate production will be boosted by new facilities which came into being at Salt Lake City, Utah, late in 1953 and the Kimberly Works, which is now in new production of ammonium phosphate. Other new phosphate production is expected in Idaho.

1954 gives promise for more potash production, as well. Sources supplying California and Arizona fertilizer needs are Trona, California, and Carlsbad, New Mexico.

Five companies have received necessity certificates for construction of phosphate fertilizer plants in the eleven Western States. They are as follows:

Best Fertilizer Co., Lathrop, Calif.
—Ammonium phosphate

Gates Brothers, Inc., Montpelier, Idaho
—Triple superphosphate

J. R. Simplot Co., Pocatello, Idaho
—Triple superphosphate and ammonium phosphate

Stauffer Chemical Co., Tacoma, Wash.
—Ammoniated superphosphate

Western Phosphates, Inc.,
Salt Lake County, Utah
—Triple superphosphate

These expansions will total approximately 120,000 tons P_2O_5 per year. The 120,000 tons new production in the Western States represents about 9% of the total expansion for the country as a whole under the 1955 Phosphatic Fertilizer Goal.

The West's production of superphosphate in the year ending June 30, 1952, was 479,020 tons.

SUGAR—

Huge beet crop yields 20 tons per acre. Cane imports and refining production increase

WESTERN beet sugar growers enjoyed one of the best crops ever in 1953. Yields were nearly 20 tons per acre, more than meeting the quota of 1,800,000 tons allowed under the Sugar Act.

In order to maintain a balance between imports, exports and domestic production, the Secretary of Agriculture sets a yearly figure for domestic consumption. Quota for 1954 is 8,000,000 tons of which beet sugar is again allowed 1,800,000 tons.

The year 1953 saw no increase in acreage of sugar beets, high production coming from the unusually large yield per acre.

New facilities

Utah-Idaho Sugar Co. completed a new plant at Moses Lake, Wash. The plant opened in September and was expected to handle 75,000,000 lb. of sugar in its first season.

Most sugar plants have increased their slicing capacities and modernized somewhat. Continuous diffusers are fast becoming standard equipment in the more modern plants.

There has been increased mechanization of the spring work in the beet fields; thinning, blocking and spraying are rapidly being mechanized to reduce labor costs, and sugar beet harvesting has become 100% mechanized.

Cane sugar

The position of cane sugar in the Western market is extremely competitive due to the fact that beet sugar production in the West is approximately equal to consumption. However, more cane sugar is being imported and more is being refined. C & H Sugar has gone to 100% bulk handling of its raw sugar, very little still being shipped in burlap bags. Liquid refined sugar in bulk has become standard for the canning industry and bulk granulated is being distributed in trucks and railroad cars. Sugar repackaging seems to be a thing of the past although the smaller sizes of packaged sugar are increasing in popularity.

Western beet sugar factories

State	Number of factories	Daily capacity (tons of beets)
Colorado	15	29,400
California	11	28,100
Idaho	6	14,200
Montana	4	8,600
Wyoming	5	8,450
Utah	5	7,650
Washington	2	4,900
Oregon	1	3,750

CITRUS FRUITS—

Frozen lemonade concentrates expands. Total citrus yield and acreage shows a decrease

BRIGHTEST SPOT in the California-Arizona citrus processing industry in 1953 was the continued expansion of frozen concentrates for lemonade production. This product appears to be the "Cinderella" of the frozen food industry. In 1949 only 200,000 cases were sold. In 1953 more than 7,000,000 were sold and some industry leaders look for a 10,000,000 annual production in the next year or two.

California and Arizona grow all the lemons marketed commercially in the U. S. But the great increase in Florida orange acreage means that the southern state will lead in the manufacture of orange juice concentrates for years to come. In 1953, as in the previous year, the amount of fruit available for processing was limited. The 1954 outlook is again for a small crop, which means that California packers will attempt the largest possible percentage of the harvests as fresh fruit.

Sub-zero warehouse

The Exchange Lemon Products Company at Corona, Calif., which is affiliated with Sunkist Growers, opened a new sub-zero warehouse last November. It is said to be the largest devoted solely to lemon products storage. It will hold 1,250,000 cases of concentrate and thus winter production can be held for release during the summer months of greatest consumption.

While the total dollar return to California and Arizona on citrus sales, both fresh and processed, was up about $6,000,000 over the previous year, many growers will not realize the cost of production on their fruit, due to low production per acre, small sizes and low quality. Growers producing a heavy volume of good quality and sizes are reported as in good economic position, and Sunkist Growers, who market 73% of the citrus fruit produced in California and Arizona, forecast increased consumption in the next 25 years, in view of the fact that the population of the United States is increasing at the rate of 6,000 per day.

Acreage reduced

Almost 32,000 acres of citrus have gone out of production in the two states over the past five years but this is considered inevitable as subdivisions and industrial development spread from the metropolitan areas.

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COTTONSEED PRODUCTS—

OUTPUT of cottonseed products for 1953 was about the same as in 1952. Two new mills have been built in Arizona, one at Gilbert by Vegetable Oil Products Co. of Wilmington, Calif., and the other at Casa Grande by the Chicasha Cotton Oil Co. of Chicasha, Okla. This is the first time any cottonseed products mill has been built in these territories.

Cotton acreage and production in California increased considerably in 1953, and the production and processing of cottonseed has been expanding rapidly in Arizona and California during the past several years. The announcement of Federal limitations on cotton acreage for 1954, however, is expected to put an end to this expansion and bring about a substantial reduction next year. Irrigation, fertilization and pest control have all contributed to increased production per acre. California is one of the more advanced cotton areas using modern cotton pickers.

Shift to solvent extraction

Throughout the cottonseed processing industry there has been a significant shift to the use of solvent extraction. Several new solvent installations have been installed in the Western area and these remove almost all of the final 3% of the oil remaining after the seeds are pressed. However, the resulting mash is inferior as a cattle feed as a result of the more complete oil recovery. Consequently, most of the new plants in the Western area employ mechanical screw presses.

Over the past several years the industry has been under a Federal price support program and large quantities of cottonseed products have moved into government hands while competitive products have moved into the markets, according to the National Cottonseed Products Assn.

Cotton oil producers have invaded the ice cream business quite successfully, with many of the large companies using cottonseed oil for making synthetic ice cream.

Cottonseed products production

CAKE AND MEAL

Yr. ending July 31	Arizona tons	California tons
1950	77,092	195,010
1951	80,421	183,390
1952	111,538	299,475

HULLS

Yr. ending July 31	Arizona tons	California tons
1950	47,121	83,465
1951	44,462	79,365
1952	67,886	143,772

CRUDE OIL

Yr. ending July 31	Arizona 1,000 lb.	California 1,000 lb.
1950	57,457	143,640
1951	64,120	132,296
1952	89,397	220,081

LINTERS

Yr. ending July 31	Arizona bales	California bales
1950	61,381	164,646
1951	61,067	161,043
1952	81,997	252,692

Source: U. S. Bureau of the Census
Cotton Production and Distribution

MEAT PACKING—

Increased slaughter over 1952 with higher beef production

THE MOST RECENT reliable appraisals indicate that most segments of the livestock and poultry industry in California felt the effects of declining market prices for their products in 1952. Over-all output was at a higher level than for the previous year, but lower prices resulted in lower cash receipts for the group as a whole. Production costs, however, remained high.

Cattle and sheep

Cattle numbers increased moderately. Cattle feeding declined somewhat but remained at a relatively high volume although many feeders experienced severe financial losses. Declines in price of feeder cattle replacements lagged behind those for finished cattle, while feed and operating costs remained high. Sheep feeders were also plagued by a receding market and the competition with increased supplies of beef at the market counter. Stock sheep numbers increased moderately despite the sharp wool price drop and reduction in sheep and lamb prices.

Hog producers sharply reduced their pig crops and inventory of brood sows due to relatively low pork prices and high feed prices. Reduction occurred on farms not feeding garbage and inventories of garbage-fed hogs remained steady. The 1952 pig crop of 647,000 was the smallest in almost 20 years.

Combined output of dressed meat from California-inspected slaughter in 1952 was 6% larger than in 1951.

Commercial slaughter of livestock in the 11 Western States for 1952

(millions of pounds)

Animals	Live weight	Dressed weight
Cattle	3,197	1,724
Calves	155	78
Sheep and lambs	308	145
Hogs	1,224	689

BREWERIES—

EASTERN breweries are moving into the West as quickly as possible, and tight competition for beer sales is expected in the future. Eastern manufacturers have recognized a growing market and excellent raw material supply in moving to the West. At the present time 80% of the beer consumed in California is produced in California.

Plant expansions

Goebel Brewing Company of Detroit was the first Easterner to move in, buying a local brewery in Oakland. In late 1952 Falstaff Brewing Corp. of St. Louis and Omaha bought the Wieland Brewing Co. in San Jose. In late 1953 Theo. Hamm Brewing Co. of St. Paul bought the Rainier Brewing Co. of California and is spending around $5,000,000 remodeling and re-equipping the San Francisco plant. It is expected to resume operation in March or April of this year.

Anheuser-Busch, Inc., maker of Budweiser, is constructing a $17,000,000 brewery in the San Fernando Valley. It will have an output of around 1,000,000 bbl. annually. Schlitz Brewing Co. is building a plant of about the same size, also in the San Fernando Valley.

Liebmann Brewing Co., brewer of Rheingold beer, has bought Acme Breweries, with plants in San Francisco and Los Angeles. Price reported to total $6,000,000.

MARGARINE—

MARGARINE manufacturers in the West made still further inroads into the butter market in 1953. Aluminum foil is being used by some of the packers, but because of the 1¢ a lb. price differential, others are resorting to parchment paper. The higher price brands are using cottonseed oil, the lower price soybean oil. Improved technique in processing soybean oil has also increased its popularity. Practically all of the margarine in the country is produced by the Votator closed, internal continuous system.

Idaho and Utah tax yellow margarine 10¢ a pound and white 5¢.

Colored margarine production in the West for 1950 was 33,397,000 pounds. A 1% sample of railroad freight in the West for 1952 made by the Interstate Commerce Commission shows 257 tons shipped from Western factories, indicating an estimated annual total of 25,700.

CANNED FISH—

Salmon pack drops off. Tuna production and sales enjoy a record year despite imports

AMERICAN CAN Co. is experimenting with a new can which could solve a number of the fish canner's problems. The can would be covered both inside and out with an enamel, except on the seams. This would end discoloration from the sulphur of the fish inside the can, and would result in lower costs. A pound less of tin would be required for every 100 lb. of tin plate.

Salmon

The pack of Alaska salmon for 1953 was 2,850,000 cases as compared with 3,500,000 cases for 1952. This is around 40% of the ten-year average.

Predictions for 1954 include the likelihood of a small pack, particularly in Bristol Bay and Southeastern Alaska. There will be fewer freezerships operating and quite possibly enameled cans now under experimentation will supplant the conventional tin model.

Number of freezerships dropped off somewhat as owners found that their operation was not too profitable.

Another new development come about in the past year, is a sea scanner manufactured by Minneapolis Honeywell Regulator Co. It is a radar type instrument used to look under the water and locate schools of fish.

The industry apparently is no closer to a solution to the problem of No. 1 tall cans. This can is too deep to hold just one pound of fish and still comply with the legal maximum 10% head space.

The market for salmon has been falling off since the government stopped buying after the war. Demand is down and a certain amount of competition is being felt from tuna.

The problems of labor, building and maintenance for a salmon canning operation on Puget Sound are simple in comparison with maintaining a plant in some of the remote places in Alaska. A plant may be used for only a few weeks out of the year and costs have been very high. Quick freezing for transportation to more accessible canning sites may ease the problem somewhat. A publicity campaign to promote the use of salmon is going ahead under full steam.

Sardines

Production of sardines in 1950 was 355,000 tons. In 1951, 136,000 tons were landed, and in 1952 production was a mere 3,000 tons. The falling off of sardine production, which once ran

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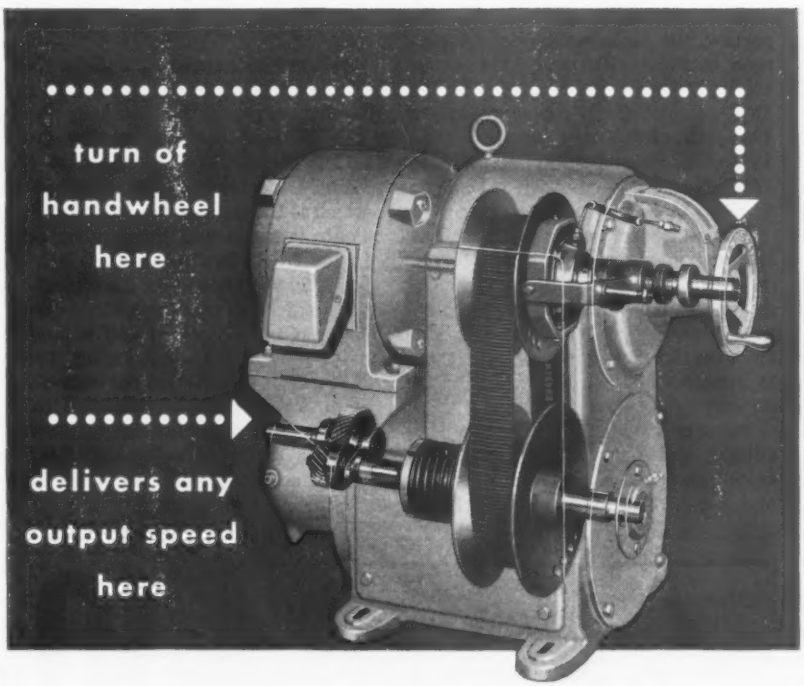

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CANNED FISH—

. . . Begins on page 117

between 500,000 and 600,000 tons, was due to failure of the spawning.

Tuna

For production and sales of tuna, 1953 was a record year. However, there is a large import problem, from Japan primarily, but scattered South and Central American countries as well. Japanese imports during the first half of the year were up 22%. In comparison, the Japanese flooded us with tuna in 1950, 1933 and 1934. Ordinarily, Japanese output is only 10% to 11% of total U. S. consumption. In 1933, the Emperor's imports were 50% of U. S. production and in 1950, 17%. Normal is considered 12% to 13% of U. S. production.

The reciprocal trade agreement has been extended one year. E. L. Morris, director of the Tuna Research Foundation, Long Beach, has requested public hearings on the tuna tariff. The tariff on tuna in oil is 12%, and tuna in brine 45%; on frozen fish there is no duty.

Automatic canning, the mechanical cutting and putting into cans, has come into vogue in the last three years and was virtually complete in 1952. Competition with Japanese tuna is made difficult by the fact that Japanese canning labor is paid 50¢ for a 12-hour day compared with the California union scale of $1.85 per hour. Our fishermen are also paid proportionately higher wages.

Considerable research is going on in automatic cleaning, with an attempt being made to handle it electronically. The U. S. Food and Drug Administration is working with the canners on cleaning standards.

San Pedro the big port

Albacore is caught only off the California coast, while the rest of the tuna family ranges as far south as Peru. The demand for this white-meated fish is increasing as opposed to the slightly darker colored tuna meat which is the bulk of the business. San Pedro is the largest fish landing port in the U. S., landing 385,000,000 lb. in 1952. San Diego was the largest up to two or three years ago, but its position has been reversed and it landed only 110,000,000 lb. during 1952. Formerly, two-thirds of the tuna came from San Diego and one-third from San Pedro. The Southern California pack for 1953 is approximately 9,000,000 cases. Ninety per cent of the tuna packing is done there.

MACARONI—

WESTERN output of macaroni and noodles is estimated as about 10% of the national total, or $10,644,390 in 1952. The 1947 Census of Manufactures showed 46 plants in the West. Per capita consumption has been increasing for several years, but may show the effects of competition from cheaper meat and potatoes.

Trend in production methods is toward greater use of continuous automatic presses and dryers. Virtually all of the industry today is dependent on consumer business in consumer-size packages, according to the National Macaroni Manufacturers Association, where 20 years ago at least half of the business was done by bulk packers.

Unusual shapes

A resurgence of unusual sizes and shapes has been apparent in the last year or so, well known to Italian consumers but new to the American public. Among these are tufoli and lasagne. New spaghetti sauces are making it easier to serve macaroni.

Several West Coast manufacturers of macaroni have been stressing the fact that macaroni products are comparatively low in calorie content and high in protein.

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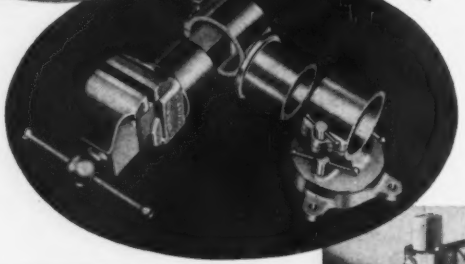

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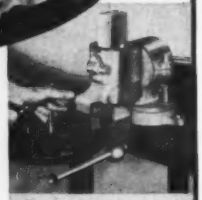

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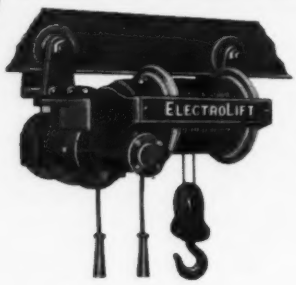

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FROZEN FOODS—

Today's bottleneck is lack of retailer cabinet space and walk-in storage coolers

FROZEN FOODS have reached the consumer acceptance stage where the main immediate obstacle to consumption is the limited amount of retailer display cabinets and walk-in coolers.

Retailers are, however, on the way to catching up. A recent survey by a trade magazine indicates that nearly half of the retailers questioned were about to expand their facilities.

Three leaders

Three frozen food items have shown outstanding increases in volume, yet the market apparently is able to absorb them easily. (Citrus fruits are discussed elsewhere in this issue under the heading of "Citrus Fruits.") Peas last year reached a level that would have been a calamity a few years back, yet there is no great alarm. California strawberries reached a peak of 92,000,000 pounds, 60% above the previous record of 1952. Strawberries, selling well, showed the biggest increase of any Western pack and probably also any national product.

About 60 per cent of all frozen fruits and vegetables are packed in the West, with vegetables showing a steady gain, while fruits and berries have not expanded as much, except for strawberries.

Pineapple concentrates

The success of the citrus concentrates has inspired the Hawaiian pineapple industry to bring out a pineapple concentrate on an experimental basis. It presents a difficult sterilizing problem, because of the necessity of controlling the esters.

While the Delmar peninsula of Maryland and Delaware is the big center for frozen poultry, the Pacific Coast has had rapid expansion in that line also. For example, Swift & Co. began in Fresno five or six years ago with a capacity of 25,000 pounds daily of frozen and fresh chilled chickens and turkeys, and now are doubling the size of the plant. Armour, Cudahy and other packers have had similar experiences.

Consumption quirks

Frozen foods require much pioneering, because consumer acceptance or resistance is frequently hard to analyze. For example, New York seemed to be a hopeless market for peas, until it was finally discovered that fresh peas had never been sold there to any great extent. The public was so used to canned peas that frozen peas did not taste like peas to them.

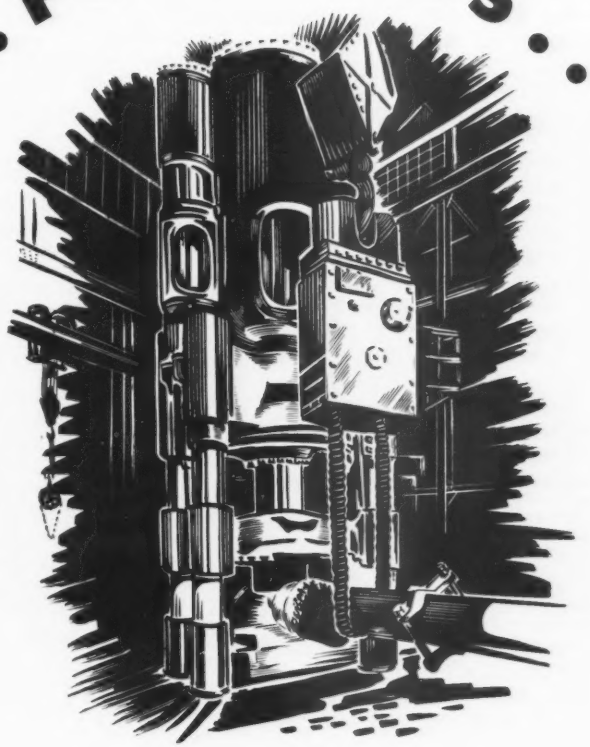
No great changes in production or packing methods have taken place recently. Most of the freezing is done by the tunnel or belt method, in which the products are subjected to a cold air blast or brine spray. Birdseye-Snider Division of General Foods are sticking to their historic plate freezers, on which the patents have expired, and some competitive plate freezers are appearing.

Vegetables are almost universally packed in paper containers, but metal cans and metal end containers are finding favor for fruits and berries because of the problem of syrup attacking paper.

Pressure cookers

For freezing in cans, pressure cookers are being used to some extent, with refrigerant replacing the heat. This enables canners to use their cannery equipment on frozen products. Its advantage is greater speed and agitation of the cans.

FORGINGS



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DAIRY PRODUCTS—

Milk surplus on the coast but other products are still short. Ice cream shows big increase

THE PACIFIC Coast states are currently experiencing what appears to be a surplus of milk. A year ago this same area was faced with a milk shortage and its population has continued to increase.

There is a shortage of almost all of the remaining dairy products. Grade A milk is a Class 1 dairy product and has first priority, bringing the highest price with the lowest production cost. In the same category with milk is ice cream, since there is a daily city demand for both of these dairy products. After the dairyman has produced as much of these items as possible to maximize his profits, he turns his attention to evaporated milk, then cheese, and lastly butter and dried milk. Consequently, although there is at present a surplus of whole milk, there is a shortage of raw milk for the remainder of the dairy products which are less profitable.

Although California is probably the nation's biggest producer of cottage cheese, most of its butter and other cheeses are imported from the Mountain States or the Midwest. At the present time, Idaho is producing more butter than California. Its production facilities easily supply fresh milk demands, leaving considerable milk to be turned into butter and cheese, which can be easily shipped.

Jack cheese moves

The Monterey Jack cheese industry, once centered at Monterey, Calif., has moved to Montana and Idaho, with the largest plants being located in this region. Butter production costs in the Midwest are considerably lower than those on the Coast, allowing shipment to the West at prices comparable to domestic production.

Malted milk powder production in 1952 totaled 29,301,000 lb., down 12% from 1951 and 19% from the 1941 to 1950 average. Except for 1949, 1952 output was the lowest since 1941.

Principal trends in cheese includes: rindless cheeses, prepackaged consumer cuts, and packaging in transparent or translucent wrappers.

Although the number of cows producing did not change substantially, better breeding has yielded higher production.

Oleomargarine has cut deeply into the demand for butter in the West, particularly since it is sold already colored.

The primary trend in dairy products distribution appears to be directed toward marketing all dairy products in single service containers. There has also been a trend toward installation of storage tanks on dairy farms to replace 10-gal. milk cans, most prominent in California, where it is estimated over 3,000 tanks have been installed. The state of Washington is second with about 1,000 and Oregon has around 150.

Ice cream manufacturers in the eleven Western States experienced the greatest increase in sales volume in 1952 over 1951 of any district and the greatest average increase for the last three years. The increase for this district for 1952 over 1951 was 12.3%.

Increase in volume of ice cream sales

Region	% increase between 1951 and 1952	% increase between 1950 and 1951
Colo., Utah, Nev.	5.28	3.38
Wyo., Mont., Idaho	7.82	1.52
Oregon, Wash.	6.86	10.65
California	14.24	1.88
Ariz., N. Mex.	11.05	28.28
All Western States	12.30	3.38

Cotton and vegetable oil producers have entered into competition in the ice cream field to a certain extent, particularly in the imitation ice cream field.

Dried milk, introduced only a few years ago, has caught on rapidly and demand has increased year after year. Sterilized canned whole milk, which appeared recently on the Colorado market, has been cleared by the State Health Department and the Colorado Attorney General's office and is being marketed as the equivalent of fresh milk. The advantage of the canned whole milk is that it can be preserved as long as the cans remain unopened.

Frozen milk concentrate is a possibility lying ahead of the dairy industry that may permit far distant areas now deficient in fluid milk to be supplied from present large producing centers, to say nothing of providing an even rate of production. Progress reportedly is being made toward the development of a product that will reconstitute properly. This problem is a main handicap to its use.

Manufactured dairy products
11 Western States
(thousand lb.)

Product	1951	1950
Butter	104,180	130,751
Cheese	75,077	81,671
Cottage cheese		
Curd	84,980	78,805
Creamed	121,061	111,558
Evaporated milk, unsweetened and unskimmed	547,995	554,934
Nonfat dry milk solids for human food	73,421	102,505
Ice cream	73,779	70,646

CANNED FRUIT AND VEGETABLES—

Output still continues upward as population grows, income swells, trees, crops, planted

AS NATIONAL population and income grow, canners of the West have been able to pack and merchandise a continually increasing volume of fruits and vegetables, despite the ups and downs of individual seasons.

Growers have increased their yields, processors get more usable tonnage out of the raw material and greater volume through the plant, while the trade has absorbed the output so far.

A temporary peak in consumption may have arrived, however, as a buyers' market obviously already is here. This may necessitate a slowdown in packing in the 1954 season.

A ray of hope toward resumption of the big export volume of canned fruits in prewar years is offered in the fact that canned cling peaches are eligible for export under the Mutual Security Act. This is stated to be the first real chance to resume this trade on a private basis since World War II.

Output trend

Nevertheless, the long-term trend is toward greater output. Six thousand acres of cling peaches, the largest single fruit pack (used for both canned peaches and fruit cocktail) in the West, were planted last year. As the growers are becoming a continually stronger factor in the situation, because of their tight organization, the merchandising problem involved may be up to them to solve. They have already recognized this to some extent by taking the lead in advertising campaigns.

More and more the processors are being squeezed between grower groups and buyer groups, which means that small canneries are no longer profitable to operate. Furthermore, it becomes increasingly difficult for the smaller operators to purchase enough green fruit to permit a profitable canning operation, because the big canning companies corner the lion's share.

Mechanical improvements

Although the big steps in mechanizing canneries to eliminate hand labor were taken during the war and in the immediate postwar years, many improvements are still being made.

Palletized handling of incoming raw material, along with box-dumping machines, is now an old story. In the warehouse, however, where canned goods are stored awaiting labeling and

shipping, automatic unloading of cans stacked on pallets is being developed.

Machines that pit peaches by means of knives or wires have been on the market for years, and have been undergoing many improvements, but the latest arrival on the scene is a machine that pits by impact. The pit is driven out of the machine by striking it at high velocity with a metal rod. This involves the use of a specially designed air cylinder originally developed for use on rockets.

With knife pitters, equipment has been devised to feed the fruit into the machine automatically, but the difficulty of getting peaches that vary in shape to align themselves so the cut will always be on the suture is still a handicap.

Another progressive step is a turnover machine to place peach halves with the cut side down, so the lye peeling operation becomes more efficient.

Much progress has been made in pitting apricots by machine.

Peeling by gases

A radical step in handling tomatoes is peeling by gases at high velocity, involving much less labor. Pressure steaming for root vegetables is coming into more general use as means of peeling.

In the harvesting operation, a mechanical picker for pole beans has appeared which promises to give a 75% recovery on beans. A tote box with a built-in pallet is being used to transport beans. The boxes are set out in the field where they are filled, replacing sacks and boxes. They are then lifted by lift truck to a motor truck.

A pilot plant canning operation has been established on the University of California farm school campus at Davis, which provides a study and check period from the time of preparing the soil ahead of planting to the final taste of the processed food.

Manufacture of its own cans was begun in the 1952 season by California Packing Corporation, the largest of the fruit and vegetable canning companies on a small basis. Whether this promises to spread further through the industry remains to be seen.

Traditionally packers have always been supplied by the can manufacturers, and until the government stepped into the picture, can closing equipment was leased from the can companies. Now the canners have to buy the equipment from the can companies, in addition to purchasing the cans themselves. This costs the canners a little more than it used to, but the canners also are not as tightly bound to an individual source of supply as formerly.

This is no time to waste time with downtime

Downtime in your materials handling line is serious business. Pile-ups and slow-downs can develop in a matter of minutes. A worn out tire . . . a burned out bearing . . . a cracked whoosis . . . whatever it may be . . . it can cost you plenty until your fork truck, your powered hand truck or your towing tractor is rolling again.

So . . . why gamble? A little preventive maintenance can stop most of those things before they ever happen. Or a quick repair or parts-replacement job can put the ailing machine back in service with a minimum of lost time.

Clark service . . . the finest, fastest and most complete service in the materials handling industry . . . is quickly available in the "Empire west of the Rockies" through strategically-located Clark Sales and Service Dealers. Our service men are factory trained . . . skilled and experienced . . . capable of handling the most complex repair or overhaul job . . . and with a genuine interest in your problems and their solution. Most of your parts requirements can be filled without delay from our stock, and emergency shipments can be made from the factory within 48 hours.

Service is our business. The trucks we sell give service . . . we service the trucks we sell . . . the finest and most complete line of fork trucks, powered hand trucks and industrial towing tractors . . . the Clark line.

Note carefully the eleven locations shown below . . . pick the one nearest you . . . and call on CLARK for service.

CLARK MATERIALS HANDLING EQUIPMENT

Sales and Service

ROBERT H. BRAUN COMPANY	Los Angeles 22, California
Fresno, San Diego, Bakersfield	Phoenix, Arizona
GLEN L. CODMAN COMPANY, INC.	Oakland 3, California
PRESTON FALLER COMPANY	Seattle and Spokane, Washington

TRAILER COACHES—

Western manufacturers account for ⅓ of U. S. house trailer production. Standards are set

TRAILER COACH manufacturers in the Western part of the United States account for approximately one-third of the total house trailers manufactured in the United States. Most of the industry is concentrated in the Los Angeles metropolitan area where approximately 60 manufacturers produce in excess of $100,000,000 annually. The industry has grown to its position of eminence in the past 20 years. Its recent growth is evidenced by the following output data, supplied by the Trailer Coach Association, accuracy not guaranteed, but based on the best information available:

Year	11 Western States	Total U. S.
1949	$ 24,000,000	$122,000,000
1950	43,000,000	216,000,000
1951	50,000,000	234,000,000
1952	80,000,000	319,000,000
1953	100,000,000	330,000,000

This phenomenal progress shown by the figures has resulted from the general population growth in the marketing area, and improvements in product design and construction. The trailer produced today is considerably improved over that made five or ten years ago. An important contributing factor has been the desire of the manufacturers themselves to improve the general quality of their respective products.

Standards established

The result of this feeling has been the establishment of certain standards which many of the progressive members of the industry adhere to. The trend in production, supplies used and equipment installed has been spearheaded by the Certified Construction Standards program.

In order to qualify as a certified trailer coach, the product must be tested by an independent testing agency. The inspection covers the running gear, plumbing, electrical wiring, brakes, and butane system. The rigid standards have been adopted by the participating manufacturers and influence the suppliers to the trailer coach industry. Thus, the basic trend can be summarized as a movement toward better construction throughout all phases of the production.

Other trends in production reported by the Association are the adoption of assembly-line methods, standardization of models, sub-assembly of components, extensive use of jigs and fixtures, integrated factory operations, improved distinctive designs, larger sizes, improved axle loading, interlocking construction, indirect lighting, grounded electrical system to eliminate static electricity, provision for television hook-up, all-metal roofs, and vapor bearers.

The trend in the supplies used is toward more versatile materials, capable of serving the requirements of the trailer coach. Some examples are the use of linoleum and asphalt tile flooring, the latest type of insulation materials, metal window frames and canopies, hot spray varnishing, house-type plumbing with exterior connections and mastic roofing beneath the all-metal cover. The industry is quick to adopt improved materials of all types.

Typical of the trend already described is the equipment and furnishings available as standard items. New types of hitches have been developed. Garbage disposal units are quite common. Larger kitchens and bathrooms are being designed. Air-conditioning and floor-ducted heat are being installed. The major appliance manufacturers have developed suitable new ranges and washing machines for trailer use. Automatic thermostatic controls are available, as are all types

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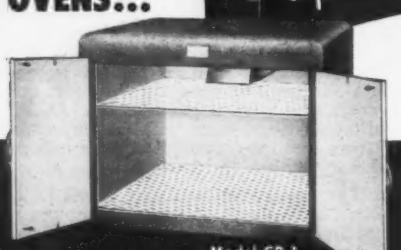

Model CR-1

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Portable. Costs less than 5c per hour to operate. Adjustable temperature control to 225° F. Fan driven forced air circulation. Uniform temperature throughout. Plugs into any 110V wall outlet—no special wiring required.

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of folding furniture and miscellaneous equipment.

The use to which today's trailers are put has largely dictated the general improvements mentioned. Less than 20% of the trailers sold are for vacationists. The vast majority are used as semi-permanent or permanent housing. Thus, purchasers have come to demand all of the conveniences they would otherwise enjoy in a conventional housing unit.

AUTOMOBILES—

AUTOMOBILE assembly on the West Coast in 1953 increased substantially over 1952. Willys Motors announces that it is buying several more parts in the West than in previous years. Ford indicates that its volume of purchases of trim, cloth, rubber and sheet metal increased 10% in 1953. The company's California purchases for the year were in excess of $100,000,000.

Figures submitted by the various assembly plants follow:

Company	1953	1952
Ford		
Ford cars	139,657	74,982
Ford trucks	24,982	15,800
Mercury	40,964	28,763
Lincoln	5,995	2,761
Total Ford production	211,598	122,306
Chrysler		
Plymouth	55,438	43,960
Chrysler	9,514	10,229
DeSoto	10,321	10,121
Dodge cars	21,539	21,809
Dodge trucks	8,122	13,945
Tot. Chrysler production	104,934	100,064
General Motors	299,677	209,777
Nash	10,966	15,939
Studebaker	23,000	19,700
Willys	8,783	10,458
Total cars and trucks assembled	658,958	478,244

BOTTLING—

SALES of bottled carbonated beverages for 1953 in the 11 Western States remained approximately the same as in 1952 with the exception of Southern California, where a slight drop occurred.

Manufacturers are showing a good deal of interest in new methods of packaging, particularly in the possibility of distributing soft drinks in cans or non-returnable containers. The industry as a whole is hoping to follow the example of the milk distributors in cutting handling costs with single service containers.

MORE REVIEWS ON PAGE 142

CONFECTIONERY—

Western sales on the increase. Fastest gain in the country

CANDY SALES in the 11 Western States are better than ever, and the West is leading the nation in percentage of sales increase. The three Coast states show an average increase for 1953 over 1952 of 12%, while the Mountain states are up 10%.

Due to increasing labor costs, there has been an increasing demand from variety and grocery stores for prebagged candy. Of secondary importance is the increase in pre-boxed candy. Although bagging reduces labor costs and speeds sales, bulk candy is still needed for display.

Supermarkets help

The outlook for 1954 is excellent and should remain good as long as the influx of population continues. Another factor in the West's increase in sales is the mushrooming of supermarkets which allow enlarged merchandising facilities resulting in more sales. There has been a noticeable trend toward purchase of better quality candy during the past year.

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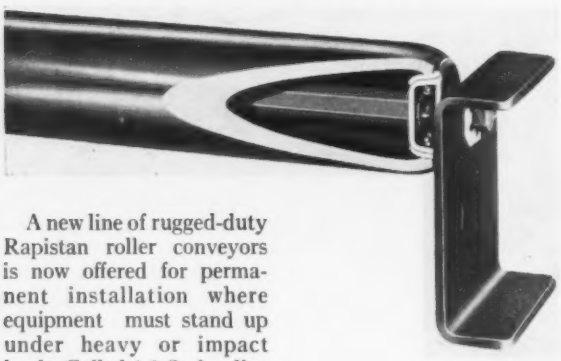
NEW EQUIPMENT & MATERIALS

USE RIP-OUT POSTCARD for more information on products introduced this month

1

New roller conveyor with high capacity



A new line of rugged-duty Rapistan roller conveyors is now offered for permanent installation where equipment must stand up under heavy or impact loads. Called 1.9 Series, line offers a choice of 154 new straight section models and 38 curves for handling numerous kinds of materials in all types of industry. *For full specifications, photos and suggested applications, circle key number on rip-out postcard.* The Rapids-Standard Co., Inc.

2

New series of miniature motors available

This new series of permanent magnet DC motors and gear motors can be supplied with overload torque limiting clutches. Motors measure $1\frac{3}{16}$ in. in diameter by four in. in length. Output speeds can be varied by changing gear set to as little as 1 rpm. Design is in conformance with military specifications. *For full information on this series, circle key number on rip-out postcard.* Mission-Western Engineers, Inc.

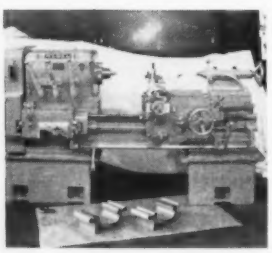
3

System subdues industrial noise

A method for effectively reducing noise in large industrial areas, through combined use of aluminum panels and glass fiber insulation, is now available. Perforated, corrugated aluminum panels are suspended on aluminum angles for forming a ceiling; then, glass fiber insulation is placed either directly on top of these panels or is separated from them and attached above to existing ceiling to leave space for ventilating ductwork or other installations. Technique is known as Reynolds Lifetime Aluminum Acoustical System. *For facts and figures, circle key number on rip-out postcard.* Reynolds Metals Co.

4

Medium duty lathe comes to low-price field



Latest development in a series of quality lathes is Nebel's new 16-in. "LA" medium duty, low priced lathe. Some of its outstanding features are: its 12 spindle speeds, shaved and hardened gears in headstock, double wall apron with hardened gears, long tapered spindle nose and heavy solid construction throughout. Each feature is incorporated in both standard engine and removable block gap models. *For more details, circle key number on rip-out postcard.* The Nebel Machine Tool Co.

5

"Non-blooming" rubber printing plate compound

A new series of unvulcanized crude rubber printing compounds that are claimed to eliminate sulphur "bloom," increase plate life and reduce curing time up to 30% are now on market. These compounds are designed primarily for use in Flexographic printing, but are also recommended for other letterpress applications. Their use is said to increase plate life since there is no sulphur to crystallize in plate, pit plate or leave hard spots in corners of solid areas. *For additional info, circle key number on rip-out postcard.* B. F. Goodrich Co.

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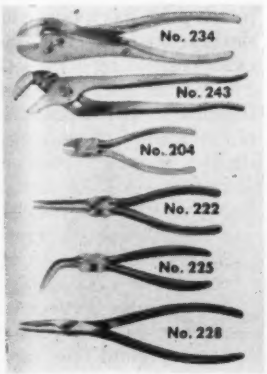
6

Six new pliers



Six new Proto pliers are now available to industry: a compound leverage type, a multiple-groove joint type, a diagonal, and three needle nose styles. Compound leverage type, No. 234 multipurpose plier, uses a patented three-piece design instead of usual two pieces. Slot for four-position slip joint is slanted, a feature said to give closer, easier jaw adjustments and less wedge action than a conventional slot design. *For additional information on all of these instruments, circle key number on rip-out postcard.* Plomb Tool Co.

7

New service bodies for improved transportation

A new line of standard service bodies for installation on ½, ¾ and one-ton truck chassis, and construction units for 1½-ton and larger chassis, are now being turned out for public utility and other industries. Designs incorporate suggestions from operators in diverse construction, service and maintenance fields where special type bodies are used extensively. *For free descriptive literature, circle key number on rip-out postcard.* Utility Body Co.

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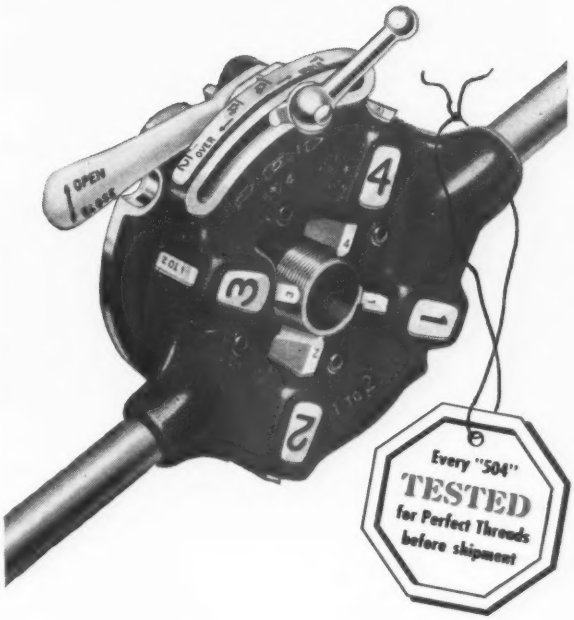

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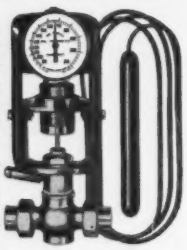

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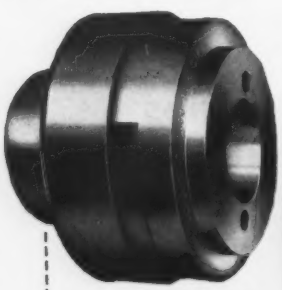

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★ **ECONOMICAL**—elimination of one flange affords cost saving over standard flywheel couplings

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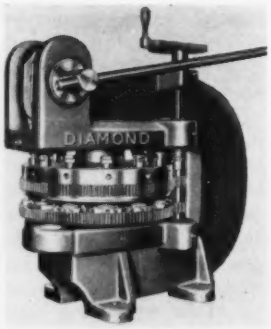
8

Hand operated turret press positions exactly



This redesigned and improved hand operated turret punch press has a punch indexing control for automatic exact positioning of die sets. Punches and dies are geared together for permanent precision alignment and lock rigidly in punch position. Turret has a 13-in. throat and contains 12 punches and dies that are interchangeable between turret positions. *For your free catalog containing further information, circle key number on rip-out postcard.* Diamond Machine Tool Co.

9

Griptite finish keeps gloves steady

To provide non-slip gripping action, a new Griptite finish has been developed for Surety Rubber's non-allergic Neoprene type industrial gloves. Neoprene regular style glove comes in light, medium and heavy weights, ranging in length from 10½ in. to 18 in. Turn-Cuff model comes in both medium and heavy weights and in lengths of 12 and 16 in. *Circle key number on rip-out postcard for additional information.* Surety Rubber Co.

10

Hydraulic attachment aids in dumping

A new hydraulic dumping attachment permits controlled dumping at any height up to maximum lift range of truck without loss of lift. Designed for use with drop bottom boxes, attachment hydraulically raises rear end of box through a hook engagement independent of fork action. Device is easily and quickly attached to front face of Yale fork trucks of all types. *For further dumping device data, circle key number on rip-out postcard.* The Yale & Towne Manufacturing Co.

11

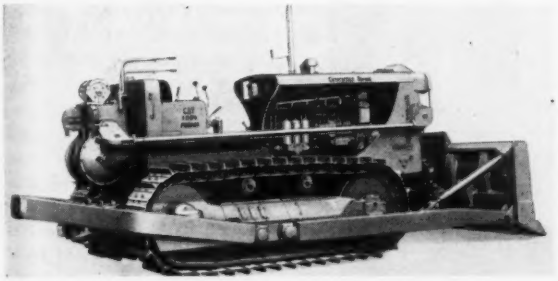
Two lightweights in auxiliary power field

Two new models of lightweight gas turbine auxiliary power units are now available to industry. One turbine is a compressed air supply unit with a weight of 170 lb. and an output rating roughly equivalent to 170 hp. Second turbine is a combination compressor and shaft power unit

from which both types of power can be extracted simultaneously. It is in 120-hp. class. *For more information, circle key number on rip-out postcard.* AiResearch Manufacturing Co.

12

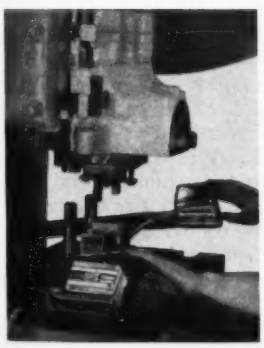
"Cat" pusher-loader



A D8 pusher tractor, adapted and equipped specifically for pusher loading work, has been developed to meet demand for a tractor capable of heap loading large scrapers. Its features include: powerful engine; 50,025-lb. weight for pusher balance and traction; bulldozer and cable controls for inline pushing action and clean up of cut; and a new transmission for longer life. *For more details, circle key number on rip-out postcard.* Caterpillar Tractor Co.

13

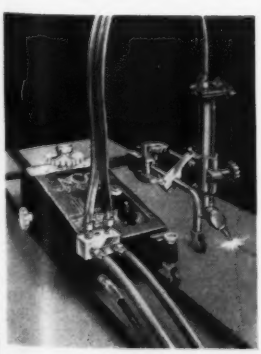
Micro press control hikes output and safety



Micro Trip is a two-hand clutch control for manually operated power machines, that is said to increase production up to 25% and to afford complete protection for operators and set-up men. Unit is available as a package for installation on existing presses. It has an instantaneous electrical response and a light touch actuation that reduces operator fatigue. It may be used with single switch control in applications where one hand is otherwise occupied. *For more detailed information, circle key number on rip-out postcard.* Minneapolis-Honeywell Regulator Co.

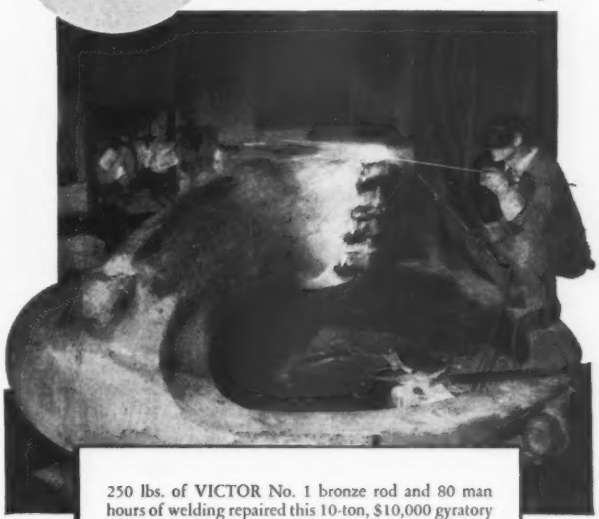
14

Accurate bevels on steel plate cut automatically



This new "floating torch" assembly is said to permit uniformly accurate bevel cutting regardless of humps, bows or other unevenness in steel plate. It is designed for use with National Cylinder Gas Co.'s Cut-O-Matic portable cutting machine. New unit has two principal parts: a guide wheel and a newly designed bevelling torch. *For literature, circle key number on rip-out postcard.* National Cylinder Gas Co.

THE MAN ON THE JOB
likes Victor adaptability!



250 lbs. of VICTOR No. 1 bronze rod and 80 man hours of welding repaired this 10-ton, $10,000 gyratory crusher casting at West Coast Welding Company, Oakland, California. Job was done with VICTOR No. 310 welding torch butt with No. 320 extension and No. 10 and No. 12 Multiflame nozzles.

Whatever the job . . . welding, cutting, heating, brazing, descaling . . . you'll start it quicker, finish it sooner with versatile VICTOR *equipment.*

Here's why:

- HAND-TIGHT QUICK-CHANGE nozzles and cutting attachments are on or off with a twist of the wrist —no wrench needed!
- STEADY FLAME—set VICTOR torch ball-point control valves to the flame you want and it *stays!*
- EFFICIENT MIXING in VICTOR'S exclusive spiral mixer and gas proportioner means peak performance at every setting, with every type of VICTOR nozzle.

VICTOR

LOOK FOR THE VICTOR DEALER SIGN

Ask him to show you why it *pays* to standardize on VICTOR.

GET THE FACTS—AND YOU'LL GET VICTOR

302

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave. LOS ANGELES 58 | 844 Folsom Street SAN FRANCISCO 7 | 1312 W. Lake St. CHICAGO 7

Here's a complete line of BABBITTED and BRONZE bearing blocks...

IT pays to get your babbitted and bronze bearing blocks from Link-Belt. For Link-Belt builds babbitted blocks in split or solid housings for oil, grease or ring-oiling lubrication. Where conditions are more severe, we offer a companion line of bronze blocks. You get the one that best meets your exact conditions. See your Link-Belt sales representative or distributor or write for Folder 2387.

LINK-BELT

BABBITTED & BRONZE BEARINGS

LINK-BELT COMPANY: PACIFIC DIVISION: Plants and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Offices and Factory Branch Stores at Portland 9, Spokane 1, Oakland 7, Salt Lake City 1. 13,235-P

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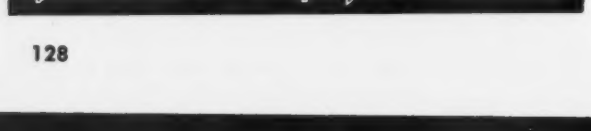
P. O. 2186, Westbury, N. Y.

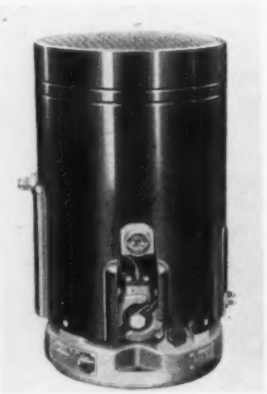
Los Angeles Representative: C. W. Warren Co. 646 N. Fuller Avenue, Los Angeles 36, Cal.; San Francisco Representative: Albert M. Schweitzer, 228 Ninth St., San Francisco 3, Cal.

Hassall



15

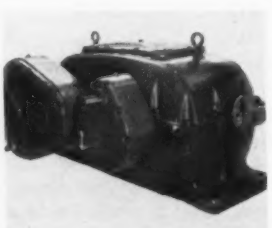
Self-contained air source



A new high-pressure DC driven air compressor provides a complete, self-contained air source for aircraft pneumatic systems. Compressor meets Navy qualification requirements and is currently in production for Navy installations. An integral package unit, embodying all accessories and controls, it spells saving in maintenance and upkeep and can be installed or removed from aircraft in less than five minutes. *For facts and figures, circle key number on rip-out postcard.* McCulloch Motors Corp.

16

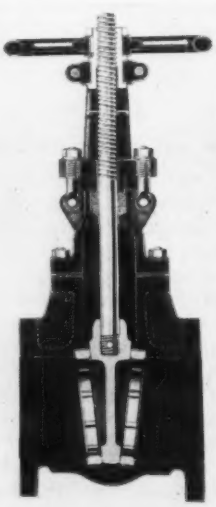
Two new variable speed drives



Link-Belt P. I. V. positive, infinitely variable speed drives are now available in two new types for 20 to 25 hp. applications. HG-6 drive is furnished with either a single reduction input or single reduction output helical gear attachment. HGG-6 drive is furnished with both a single reduction input and single reduction output helical gear attachment. Folder No. 2374 gives detailed information on size 6 P. I. V., its types and many ratios and assemblies. *For your free copy, circle key number on rip-out postcard.* Link-Belt Co.

17

Iron gate valve is corrosion resistant



A new 125-lb. iron gate valve has been designed for mildly corrosive service in process industries. Valve's cast iron body and bonnet contain 3 per cent nickel for an extra margin of corrosion resistance over ordinary cast iron. Trim, where corrosion usually does greatest damage, is made of most corrosion-resistant alloys used for valves. A choice of trim materials is offered—either 18-8 Mo stainless steel or all-monel. *For more information on new 3% nickel iron gate valve, as well as complete Lunkenheimer iron valve line, circle key number on rip-out postcard.* The Lunkenheimer Co.

18

Bench size surface plates aid toolmakers

Toolmakers Flat is a black granite surface plate, designed in a new, small size, for bench use. Finished to an overall accuracy of 0.0002 in., it measures 8 x 12 x 2 in. and weighs only 15 lbs. It will find favor in small plants, for tool and die makers, benchmen, machinists, model shops, etc. *For literature, circle key number on rip-out postcard.* Collins Microflat Co.

19

200-watts in compact size

A 200-watt, standard-voltage incandescent lamp is now made in same physical size as usual 150-watt PS-25 lamp. Designed to replace standard 200-watt PS-30 clear and inside-frosted lamps, this smaller lamp lends itself to use in places where a larger bulb would not fit, thus making it possible to obtain increased illumination from luminaires previously limited by bulb size. *For further information, circle key number on rip-out postcard.* Westinghouse Electric Corp.

20

Improved roller bearing ups productivity

Productive time of rugged equipment used in industries such as steel, railroad, paper-making and quarrying, is

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BULLETIN 161

2 BULLETINS on SHORT RUN STAMPINGS

BULLETIN 101

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SERVICES BULLETIN NO. 161 describes the facilities that make Federal a *one-stop* stamping service. Specifications cover special die stamped wrenches, nameplates, and quality short run stampings from any stampable material.

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Listed below are some of the operations discussed in Oakite's 44-page handsomely illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite methods can give you better production with greater economy.

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- ☐ Barrel cleaning
- ☐ Burnishing
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Clipper Hooks are made of the finest quality wire—BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip—give longer satisfactory service.

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Phone your Industrial Distributor for a demonstration!

No. 9 Portable Lacer

CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2, MICHIGAN, U.S.A.

Clipper BELT LACING EQUIPMENT

claimed greatly increased by an improved spherical roller bearing, with service life two to three and one-half times longer than formerly possible. Bearing also has increased capacity ratings of from 25% to 50% and permits heavy industrial equipment to handle greater loads. *For further information, circle key number on rip-out postcard.* SKF Industries, Inc.

21

Solenoid valves that are explosion-proof

Line of midget 2-way and 3-way solenoid valves now includes types with explosion-proof solenoids, suitable for class 1 group D hazardous locations. Solenoid enclosures are of cast iron, with ½-in. threaded conduit connections. Conduit boxes can be revolved 360 deg. *For specification sheet, circle key number on rip-out postcard.* Automatic Switch Co.

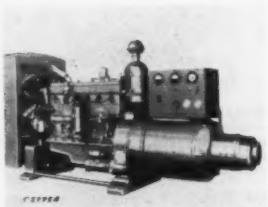
22

Time element in lamp exchange is licked

One standardized Unilet body, to fit both 60- to 200-w. dome unit assemblies, is said to solve time-consuming problem of lamp exchange in hazardous locations. Quick servicing of lighting units is claimed easily accomplished, in less than one minute, with assured safety. Because of assemblies' interchangeability, it is possible to set up a "stand-by" system to take care of lamp replacement and increased wattage needs. *For more information, circle key number on rip-out postcard.* Appleton Electric Co.

23

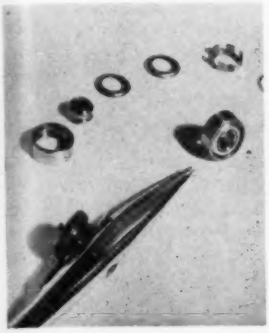
New 50,000-watt electric plant



This new 50-kw., 62.5-kva electric plant, Model 50KA, is designed for any type of job requiring heavy duty primary or emergency standby power. Manufacturer says that it will deliver a full rated 50,000 watts at 80% power factor with ample overload capacity. International Harvester gasoline engine delivers 104 hp. at 1,800 rpm., and has a 450-cu. in. piston displacement. Onan-built generator is of drip-proof design, direct connected to engine for permanent self-alignment. *For further information, circle key number on rip-out postcard.* D. W. Onan & Sons Inc.

24

Protection for tiny bearings



Dirt, lint and contaminated atmospheres are no longer a limiting factor in application of miniature ball bearings. Now available is a series of single and double-shielded, fractional-inch size precision ball bearings of both full race and retainer type construction. These new bearings, down to $\frac{5}{32}$-in. outside diameter, are now in production in nine sizes. *For specification sheets and further information, circle key number on rip-out postcard.* Miniature Precision Bearings, Inc.

25

Saves taps, time and money

"Tap Magic" is said to free stuck taps and reamers *right now.* A blend of chemicals for use in tapping, deep hole drilling, machine or hand reaming, etc., on any metal, it is non-inflammable and non-explosive. *For description and price sheets, circle key number on rip-out postcard.* Smith Tool & Engineering Co.

26

Manifolds allow flexible cylinder arrangement

New line of Oxweld stationary manifolds features advantages that mean economies of a dependable and con-

Call Nutting For TRUCKS WHEELS CASTERS

FIG. 1452 Heavy duty bar handle platform truck

FIG. 1301-X "Auto-Load" Barrel Truck

FIG. 1152 DPL Light weight 2-wheel utility truck

FIG. 1011 Balance-type platform stake truck

FIG. 16 Western Pattern with Steam Bent Handles

FIG. 219 Golden Gate Pattern

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Chapson & Stickler, Ltd. 755 Sheridan St., P.O. Box 2822

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OAKLAND
Roll-Rite Corporation 801 Jefferson St.

TUCSON
L. J. Clarke and Co. 426 East 7th Street

PORTLAND
F. E. Bennett Co. 426 N. W. 6th Ave.

SALT LAKE CITY
Equipment Supply Co. 16 Post Office Place

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Export Sales Representative SCHEEL INTERNATIONAL, INC., 4237 North Lincoln Ave. Chicago 18, Illinois

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CLEVELAND
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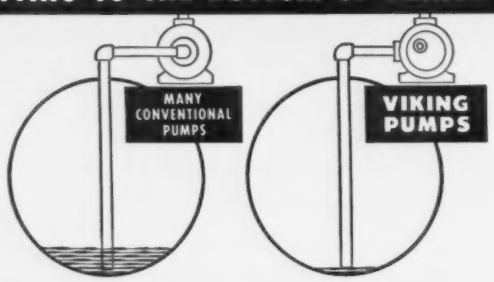
GETTING TO THE BOTTOM OF THINGS



The difference to you between profit and loss can depend upon the simple, positive action of Viking Rotary Pumps. Their fast, thorough stripping action can mean that you get all you pay for when emptying barrels, tanks and other containers instead of leaving a part of each load. Where many other pumps fail, efficient stripping is possible with Vikings because of the suction lift created by our famous Viking "gear-within-a-gear" pumping principle.

Whether the liquid you want to pump is thick or thin, you will pump more . . . faster with a Viking. What is your pumping problem? Send it along today and ask for bulletin 54SA.

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Cedar Falls, Iowa

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E. E. BURTON, 4432 Long Beach Ave., Los Angeles 58, Calif.
DE LAVAL PACIFIC COMPANY, 61 Beale Street, San Francisco 5, Calif.

tinuous gas supply. Line offers a wide choice of both single-regulator (M-25 series) and dual-regulator (M-20 series). Both series include manifolds for use with oxygen, water-pumped inert gases, oil-pumped inert gases or air, high-pressure fuel gases, and liquefied petroleum gases. *For more information on this equipment, circle key number on rip-out postcard.* Union Carbide and Carbon Corp.

27

Converter brings two-way radios up-to-date

Two small, efficient 12-volt to 6-volt converter units have been developed to prevent obsolescence of 6-volt mobile two-way radio units by trend toward 12-volt automotive electrical systems. One converter is capable of supplying from 10 to 50 amperes, second one can supply from 10 to 30 amperes. Both units, utilizing a special transformer-vibrator circuit, are said to have conversion efficiencies of better than 80%. *For more details, circle key number on rip-out postcard.* Motorola Inc.

28

New concept in carton and drum handling

A new combination carton and drum clamp, that can handle both types of containers without use of skid or pallet, is adaptable to all Elwell-Parker center-control, sit-down fork trucks, both gas and electric-powered types. Device is designed primarily for loads having good dimensional stability and for solid containers with contents of non-fragile goods. *For more information, circle key number on rip-out postcard.* Ira G. Perin Co.

29

For speedy finishing jobs on wood or metal

Once and for all, "Gritcloth" solves clogging sandpaper problems. Product's new open-mesh design allows removed particles to flow right through, and sharp abrasive teeth to keep right on cutting. Tests are said to show "Gritcloth" has 10 to 15 times life of ordinary coated papers. *For more information, circle key number on rip-out postcard.* Bay State Abrasive Products Co.

SULPHURIC ACID
for the west
66° BAUME 20%
98% OLEUM
and special grades

Garfield CHEMICAL & MFG. CORP.
ESTABLISHED 1916
700 PACIFIC NAT'L BLDG.
SALT LAKE CITY, UTAH

HELPFUL LITERATURE

30

Handling products by hand mechanics

Jervis B. Webb Co. now puts out a new 20-page guide on hand pushed trolleys, cranes, and switches. Complete specifications are included on each type of equipment. It will be of interest to firms where cost of a power driven trolley conveyor cannot be justified. 453

31

Meehanite for forming and stamping dies

This 26-page booklet commences with discussion of outstanding features of Meehanite metal dies: long production runs; maximum wear resistance; hardness to specification; freedom from galling and scoring; high strength properties and rigidity. Pictures show advantages of Meehanite castings, and actual usage to which they have been put. Included, on last page, is a tabular summary of physical properties of these castings. *Meehanite Metal Corp.* 41

32

"Basic Hot-Zones for Cement Kilns"

Put out by Chemical division of *Kaiser Aluminum & Chemical Sales, Inc.*, this 30-page brochure features Permanente basic refractory linings for cement kiln hot-zones. A brief rundown of booklet's contents turns up these topics: installation procedure; kilns with tapered or conical hot-zone sections; four-crew method of laying kiln lining; suggestions for starting kiln; cooling kiln for repairs, etc. Final page is devoted to a chart of Permanente cement's typical physical properties.

33

New rotary electric and electronic equipment bulletin

Mission-Western Engineers, Inc., offers a new bulletin of important data and information prepared as an aid to engineers, designers, and users of electric equipment. Each piece of rotary electric and electronic equipment, built by company and described in these pages, is built according to military specifications. Pages give specification data and detailed diagrams for your information. 153

34

Three folders on ventilators

After reading this collection, bulletins PH44, S-15, and PP 22, you will have a good idea of Penn Hi-Ex venti-

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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WESTERN INDUSTRY

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lators; Penn power, turbine, and dynafan ventilators. Folders are complete with capacity and dimension tables, pertinent text, and pictures. *Penn Ventilator Co.*

35

"Modern Methods for Plant Layout"

This 32-pager gives an excellent idea of reasons for being able to see your plant and office layout in two and three dimensions, as a help to building or to simply shifting about. Contents include: temprint data, tapes, symbols, models, case histories, photos of layouts, materials handling layout, stock of models, contract data, and sales aids. *F. Ward Harman Associates.*

36

Guide to metal products and industrial supplies

Here is a 300-page selection guide, put out by *Kyle and Company,* on its steel products and metal industrial supplies. Contents encompass: bars and shapes; sheets and plates; steel sash; fence-posts; bolts, nuts, screws; blacksmiths' tools, solder, etc. Last section is devoted to "useful information." This includes information on solders and metals, aids for measuring, a discount computer, etc. On first page of each section, book gives a brief glimpse into some part of California history.

37

"Washing machines for industry"

Proper cleaning is now regarded as a vital step in production of whatever metal parts or products you manufacture. No matter what type of cleaning equipment you expect to buy, this 24-page booklet, from the *Alvey-Ferguson Co.,* was designed to help you. It shows what to look for in selecting equipment that will do everything expected of it—that can be coordinated with other operations in your plant for efficient production—and how to determine if it will provide years of trouble-free service.

38

Concerning Jewel brand abrasives

Here is a brand new catalog and price list for *Abrasive Products, Inc.* The publication starts off with a comparative rating chart plus a detailed table of standard goods manufactured. Following pages thoroughly cover sheets, rolls, belts, and discs. A section on retail shelf products includes ready-packs and standard unit packages. Brochure is concluded by a section on floor sanding products and specialties. 22

HELPFUL LITERATURE

for the plant operator who wants to keep informed

39

Some answers on materials handling

Hamerslag Equipment Co. puts out a bound folder containing a whole lot of little folders on equipment that will come in handy when it comes to materials handling. Some items represented are: pallet and skid racks; ratchet rack; aluminum ladders; magnesium dock boards; safety tongs; corrugated skids and tubs; and various types of trucks.

40

On flexible couplings for every service

An eight-page, two-color brochure about Lovejoy's newly developed line of flexible couplings covers all bases on specification data, diagrams, photographs and other informational material. A list of company representatives is included for your convenience. *Lovejoy Flexible Coupling Co.*

41

Eutectic's new welding booklet released

A 32-page "DirectoRod Guide" is newly published giving recommendations for over 300 types of metal joining operations. There are over 40 illustrations of practical applications taken from case history files plus 12 pages of easily followed charts. Booklet is divided into sections, each dealing with a specific base metal. At the end of each section is a chart listing electrodes, alloys and fluxes which may be used on various types of base metal. *Eutectic Welding Alloys Corp.*

42

Details on cylinders

A new, complete bulletin comes from Air and Hydraulic division of *Lindberg Engineering Co.*, featuring its standard line of heavy duty air and hydraulic cylinders. Line is described in detail. Descriptions of large, special custom built heavy duty air and hydraulic cylinders are also included. 800

Circle key number on rip-out card for literature you want

43

Handy guide to lift trucks

A new reference guide on material handling equipment comes from *Lift Trucks, Inc.* Describing latest improvements, it illustrates various features, sizes, models and gives complete specifications on single stroke, multi-stroke and hand electric power lift trucks. 35

44

"Physical Properties of Synthetic Organic Chemicals"...

...is a 20-page booklet just issued in 1954 edition by *Carbide and Carbon Chemicals Co.* It presents data on more than 330 products and features 36 new chemicals. For easy reference, chemicals are arranged by family groups. Condensed data on applications are presented and physical properties are given in tabular form. F-6136

45

"Facts About Silicon Carbide"

In addition to its abrasive applications, silicon carbide is finding increasing use in manufacture of a number of other, different types of products: super-refractories and refractory cements; electric heating elements; resistors; deoxidizers in metallurgy or iron and steel; catalyst carriers, and porous media. A 52-page brochure from *The Carborundum Co.* presents properties of silicon carbide as related to these applications and outlines manufacturing techniques.

46

Diamond impregnated grinding wheels

A folder plus specification sheet plus sheet of diagrams will give you a full presentation on "Degea" diamond impregnated grinding wheels. Features covered include durability, rapidity, binding, size of grain, concentration, and types and sizes. *D. & M. Export-Import Co.*

47

Sealers and coatings described in booklet

A 12-page, illustrated booklet to assist aircraft manufacturers in solving tough design and production prob-

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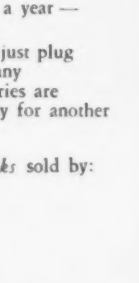

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lems by proper application of adhesives, coatings and sealers is now available. Booklet's purpose is to acquaint users with combination of 3M products, aircraft industry experience and engineering services that are available to solve either simple or complex manufacturing problems. *Minnesota Mining and Manufacturing Co.*

48

A folder on Berger steel lockers

Folder starts off with construction features and general specifications of Berger steel lockers, claimed to meet every industrial and school requirement efficiently and economically. Lockers recessed in corridor walls, basket racks and wire baskets, and double door classroom wardrobes come in for their full share of attention. Specification charts, drawings, and photographs provide additional material information-wise. *Republic Steel Corp.*

49

Win your battle against hand accidents

A simple three-fold pamphlet will tell you about gloves said to protect your workers' hands against abrasion, oils, greases, fats, waxes, and most chemicals—even from splashes of boiling acids. "North Strongoflex" P.V.C. glove types are pictured with description given of each. Illuminating tests on these gloves are summarized and presented for your information. *Industrial Supplies Importers.*

50

Application data on Armstrong's thermosetting adhesives

Steps discussed on this sheet are basic and necessary to use of all heat-curing, thermosetting adhesives. Discussion includes: surface preparation of materials; adhesive application; conditioning of adhesive film; applying pressure; and curing. Steps in maintaining pressure are diagrammed. *Armstrong Cork Co.* ND-588-1053 A

51

Designed to meet modern materials handling problems

A brochure from *The Forker Corp.* describes Ohio tramrail, an overhead transportation system, and sets forth its advantages and primary objectives. Other headings in this publication include: Ohio Teerail, Beamrail, Tramrail switches, Tramrail cranes, shielded electrification, Tramrail trolleys,

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describing scores of Solenoid Valves?

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Contact our nearest representative—we have several in the Pacific Coast and Mountain States as noted below. He can arrange to get you prompt delivery from Los Angeles on items carried in stock. He can also initiate engineering service on Solenoid Valves or other types of Electromagnetic Controls.

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Pacific Factory Branch: 923 East Third Street, Los Angeles, Calif.
Phone: Michigan 0931

motor propelled trolley, and standard yoke assembly. Diagrams and enumerated features accompany each description. A list of representatives is presented on last page. 109

Circle key number on rip-out card for literature you want

52

Got power transmission or process control problems?

Rucker says, "Consult Rucker" for job analysis, components, engineering and design, manufacture and installation. A folder, telling how this organization can serve you, lists services and facilities. It winds up with a list of industries which *The Rucker Co.* serves: automotive, canning and packing, concrete, food processing, military, steel, etc.

53

Materials handling the Ace way

Frank L. Robinson Co. offers specification sheets on its Ace line of pallet rollers. Application, detail and over-all pictures appear in addition to lists of characteristics and specification charts. Pallet rollers covered in this manner include: Ace "Swivel" King, Ace "Reefer" King, Ace "Stevedore King," and Ace utility pallet rollers. 102K, 103K, 104K, and 106

54

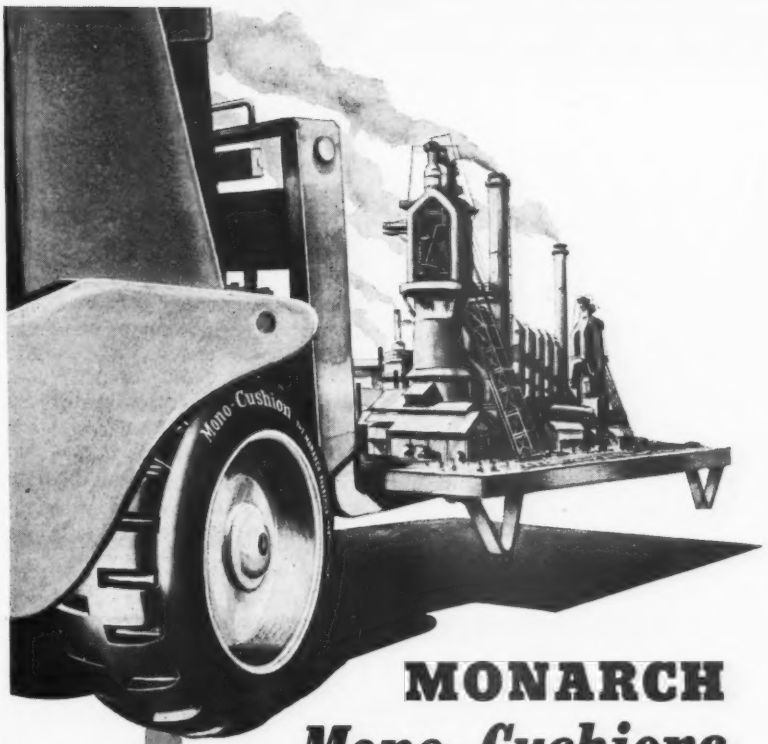
Power engines feature economy and long life

Hall-Scott butane-propane and gasoline truck engines, for both highway and off-highway use, are subject of this folder. General specifications plus specifications for particular models are clearly presented. Text about special features, such as unit construction, overhead cam shaft, and high torque, wind up final page. *ACF-Brill Motors Co.*

55

"Heat on Wheels . . ."

Here is an attractive brochure on Mortemp's portable heating unit that can be moved from work zone to work zone as it is needed. Through its patented counter-flo principle, Mortemp heat machine discharges a blanket of heat at floor level, thus insuring comfortable, efficient working conditions and saving fuel dollars. Learn all about it in this publication. An entire half page of specifications are given for models L and H. *Mortemp Heat Machine Co.*



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TODAY . . . IN PLANTS OF ALL TYPES . . . fleets of materials handling trucks are setting new mileage and economy records on MONARCH Mono-Cushion tires. Developed to meet the need for a more durable, shock absorbing solid tire, Mono-Cushions are specified by original equipment manufacturers . . . as well as users . . . because of their dependability and performance.

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BRING YOUR SOLID TIRE PROBLEMS TO MONARCH . . . let our industrial tire specialists solve them for you. There is a MONARCH tire for every materials handling truck application.

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SPECIALISTS IN INDUSTRIAL SOLID TIRES AND MOLDED MECHANICAL RUBBER GOODS

56

Literature on a heavy duty machinist's vise

A folder from *FlexiVise Co.* will tell you all about "a production worker on the bench who is never on your payroll." Vise is photographed and labeled. There are application pictures, descriptive material, and specifications. Last page features stationary base and swivel base, two more products manufactured by firm.

57

Get your free copy of Instrumentation magazine

Here is a sample of interesting and helpful material appearing in 48-page, third quarter 1953 issue of Instrumentation magazine: story on pressurized blast furnaces at Republic Steel Corp.; how a Btu. controller at Iowa Public Service gas plant paid for itself in less than six months; way that Julius Kayser & Co. Ltd. used instruments to help double production of nylon tricot fabric. Information also is included on test room control, recovery of hydrocarbons, etc. *Minneapolis-Honeywell Regulator Co.*

Circle key number on rip-out card for literature you want

58

New aircraft electric motor bulletin

A total of 22 models of aircraft electric motors are illustrated and described in a bulletin just issued by *U. S. Electrical Motors, Inc.* Range is 1/20 to 16 hp. Motors described are high frequency induction type, 3-phase alternating current, used for numerous controls in aircraft components. Illustrations show methods of testing aircraft motors under conditions that simulate altitudes as high as 80,000 ft. 1535

59

Eight reasons why . . .

. . . Insul-8-Bar conductor system belongs in your plant. Here they all are in a folder from *Insul-8-Corp.* Pictures of parts and of application visually back up textual material on this safe, low cost, flexible conductor system for Trambeam cranes and monorails. M-24

60

Info on Yale's tri-rotor pumps

Charts, line drawings, photographs, and performance curves make this spiral-bound brochure from *Yale & Towne Manufacturing Co.* a most illuminating one. Last eight pages are devoted to tables including: head and pressure equivalents, pressure and equivalent ft. head of water; recommended suction line sizes; and friction losses in pipe. JP3-5M

61

"Motion Pictures and Slidefilms"

In this 68-page film guide, *General Electric* lists motion pictures that it has been making for some forty years now. Films listed cover a wide subject range: majority are subjects of broad general interest given educational treatment; some describe firm's products; others are of specialized, limited interest and are intended for restricted audiences. A section, "Notes on Film Projection" gives help in planning film showings. Excellent selection.

JET-O-BLAST
THE SENSATIONAL NEW PORTABLE SAND BLAST

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1. LIGHT WEIGHT - Weighs only 120 pounds ready for instant use!
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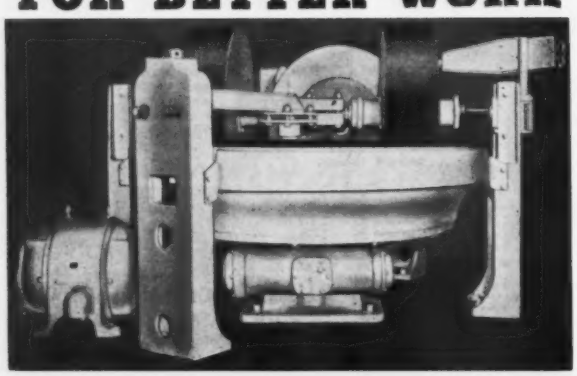

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62

"Report on U. S. Intercoastal Shipping"

Problems and hopes for recovery of U. S. intercoastal shipping, with particular reference to San Francisco Bay Area, are set forth in this comprehensive report. Material includes: causes of shipping loss; program for shipping recovery. Charts and tables appear from pages 35 to 39. *The San Francisco Bay Ports Commission.*

63

Westinghouse welding products data

Rating tables, electrical specifications and application data, on Westinghouse AC-DC industrial welders, portable and skid mounted, graphically illustrated in a series of four welding products catalogs. Forty pages of good information for welders, welding engineers, process engineers and maintenance men. *Westinghouse Electric Corp.* B-5452, B-5453, B-5455, and B-5622

64

Bethlehem tool steels

A 19-page booklet, from *Bethlehem Steel Co.*, tells all about concern's carbon tool steels in x, xcl, xx, and xxx grades, and about its carbon-vanadium tool steels in best and superior grades. Grade specifications, uses, characteristics, and results of hardenability tests on carbon tool steels are among facts and figures presented. Photographs and graphs do a good job of illustration. 346

65

Folder on welded mechanical and structural steel tubing

Brochure from *Brainard Steel Co.* will give you information on fabrication, joining tubular sections, and fabrication help. A whole page of typical applications are listed. Tables include weight per linear ft., size tolerances, and gauge tolerances. District offices and tube division sales representatives are listed on back cover.

66

Check this carbon raw material

A 16-page booklet from *Portland Gas & Coke Co.*, on its special carbon raw material, contains useful technical information that will be of interest to manufacturers, engineers, and purchasing agents who buy solid fuel, or carbon for chemical, electro-chemical, or electro-metallurgical process. For all questions not answered by booklet, firm invites you to jot down notation on postcard enclosed in this brochure.

67

Industrialists check Chico municipal airport

According to this booklet, Chico "maintains the largest municipally-owned airport in California, north of San Francisco, with extensive industrial sites immediately available." A location map is accompanied by features of these sites, economic data, availabilities, and on-the-spot pictures.

68

Fairfield-Suisun for Bay Area location and expansion

Here, in brochure form, is a factual picture of Fairfield-Suisun community. There are facts and figures on subjects including location, population, climate, education, housing, water supply, agriculture, and Travis Air Force Base. Transportation and labor market are well covered and employment, assessed valuations, and building permit tables in back of book should prove valuable.

69

"Modern Methods for Plant Layout"

To solve complex, expensive problems of layout in these days of expansion, there are both two- and three-dimensional layout processes which

RUD-o-MATIC

• FOR SIMPLE, FAST AND SAFE SINGLE LINE CLAMSHELL BUCKET OPERATIONS ON ONE-DRUM CRANES

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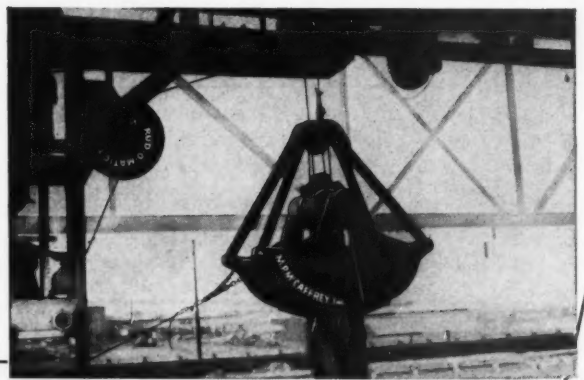

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McCAFFREY EXTRA LIGHT WEIGHT BUCKETS OR McCAFFREY TONGS are recommended for maximum efficiency in handling materials such as sand, shavings, coke, building materials, etc.

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Write or phone TODAY for further information:

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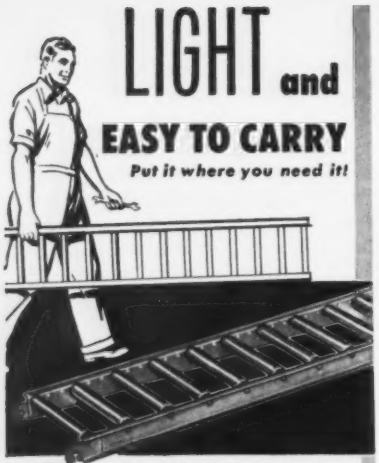

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Sectional Roller Conveyor

• Ideal for loading and unloading, "spot" conveying jobs. Keep LITEWATE conveyors handy in your shipping room—carry a section on your trucks.

Handles commodities up to 80 lbs—moves bags, cases, cartons, hollow bottom, narrow, cleated and irregular packages or articles not suited to wheel conveyors. Operates at grades as little as ¼ in. to ⅜ in. per ft. Available in 10 ft. and 5 ft. straight sections and 90° and 45° curves; with interchangeable spacing of rollers—from 1½ in. to 12 in. centers. Write Dept. WI-154 for Bulletin 63-B.

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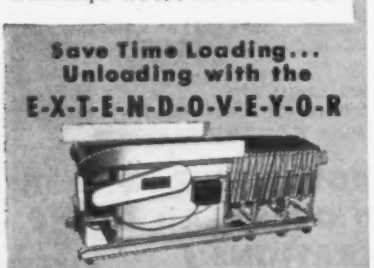

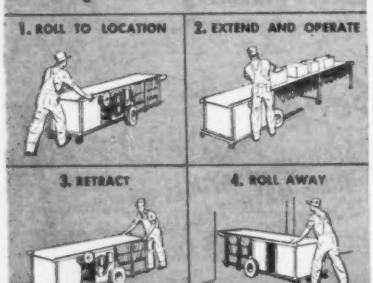

• A compact, mobile, easily moved power-belt conveyor unit. Extends to 46 ft. and retracts to 9 ft. 10 in.

Reaches into cars, trucks, trailers. Handles commodities weighing up to 150 lbs.

Available in two models—1 way stretch and 2 way stretch—and 4 sizes. Write Dept. WI-154 for Extendoveyor Bulletin.

Send for Bulletin 63-B describing Standard's gravity and power conveyor units. Address Dept. WI-154

STANDARD CONVEYOR COMPANY

General Offices: North St. Paul 9, Minn.

SEATTLE 4: Russell G. Daley, 902 First Avenue South. PORTLAND: 1115 N.W. Glisan St. SAN FRANCISCO: 840 Harrison St. LOS ANGELES: 115 E. 23rd Street.

may be used individually or in combination. A well illustrated 32-page brochure, from *F. Ward Harman Associates*, encompasses temprint data, tapes, symbols, models, case histories, photos of layouts, material handling layout, stock of models, contract data, and sales aids.

70

Next time try Pony Express

A specification folder from *Rocky Mountain Steel Products, Inc.*, gives complete details, including diagrams on Electric Pony Express Models B and O battery-powered trucks. Final page shows added equipment: battery with carrier; battery charger or rectifier; and motor generator.

71

In answer to your air and gas handling problems

In an eight-page brochure from *Sutorbilt Corp.*, pictures and full descriptions are presented for firm's blowers, gas pumps, and vacuum pumps. Construction, operation, types of drive, relief valves, timing gears and thrust bearing assembly are all hit upon. A chart of blower dimensions and one of performance examples take up a good portion of final pages. 59D

72

For reclaiming unfused flux

This tri-folder from *Vacuum Cleaner Mfg. Co.* describes flux-recovery equipment that may save you many dollars. Pictures and descriptions are presented for four models. Recovery capacity and specification tables give additional information. Typical installations appear on back page.

73

A modern method of roof resurfacing

General description and directions for application, accompanied by pictured steps, are given in this folder on Horn Dri-N-Tite asbestos fibre coating. Types of surfaces that can be protected by this material are mentioned, and a partial list of Dri-N-Tite users is given on last page. *A. C. Horn Co., Inc.* 50407210

74

Head first to safety

Chicago Eye Shield Co. puts out its new 64-page product guide showing a wide variety of head and eye protective equipment for industrial use. Designed primarily for those in charge of safety in foundries, factories, machine shops, mines, etc., this book contains hundreds of illustrations covering all types and sizes of CESCO safety equipment. 27

75

Sixth edition of storage battery manual

Users of storage batteries for cycle service in industrial trucks, mine locomotives, shuttle cars, and M-H equipment will be interested in this new edition of storage battery "Red Book" put out by *Gould-National Batteries, Inc.* Publication begins with a brief treatise on theory of lead-acid battery. Detailed instructions on care and

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operation of batteries and maintenance repairs, information on standard and special parts and technical tables are given.

76

Reference guide to silicone products

Here is a most thorough and comprehensive listing of silicone products. Fifteen new products, ranging from adhesives to molding compounds, are added to list. Application index is expanded to include three new categories. New applications for silicone fluid are detailed, and performance of Silastic as a dielectric is also described. *Dow Corning Corp.*

Circle key number on rip-out card for literature you want

77

Find out about this reciprocating work piece holder

Here is a specification folder on Osborn's new reciprocating work piece holder with universal head. A well-labeled picture shows you machine's parts, and text explains its various features. Low cost operation and versatile application are two selling points in which you will be interested. *Osborn Manufacturing Co.* 266

78

Discover how to "Wrap Out Rust"

Nox-Rust Vapor-Wrapper is a chemically active paper that blocks rust in one simple operation. A 16-page brochure from *Nox-Rust Chemical Corp.* tells you what this product is, how it works, and how it saves. Several firms are mentioned as employing this product at savings. Pictures show you how they do it. Commercial grades are shown, and final page is devoted to a question and answer session on this product.

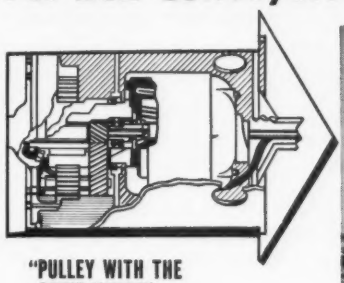
79

All about Cleveland pneumatic vibrators

Text, pictures, charts and drawings illustrate, for your benefit, various types of pneumatic vibrators. A detailed price list appears at back of book, and firm's hospitable offer to make engineering recommendations, without obligation, is accompanied by a square-lined sheet on which you can sketch your problem and fill in engineering data in order to take advantage of offer. *The Cleveland Vibrator Co.*

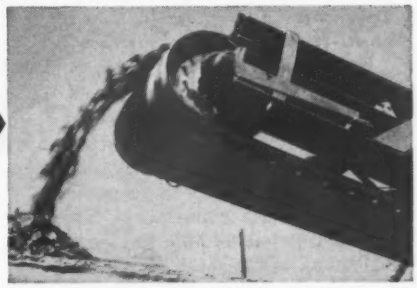
YUBA-SCHROCK MOTORIZED HEAD PULLEY

For Belt Conveyors and Bucket Elevators



"PULLEY WITH THE DRIVE INSIDE"

Safe, compact, simple —no chains, no belts, no sprockets, no exposed motors.



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Pulley shell of this revolutionary head pulley rotates around electric motor and reduction gears, which are held stationary by torque arm attached to conveyor frame. Quickly installed — requires no more room than idler pulley. All moving parts protected against weather, grit, dirt. Diameters 10½" to 56". ⅓ to 125 hp. for voltages to 2300. Job proved.

Write TODAY for folder and name of nearest distributor.

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Pulley and Sprocket Dept.

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Accuracy...
Fast, efficient assembly of precision equipment demands absolute accuracy and uniformity in all components—including springs.
For over a quarter-century we have specialized in the design, production, and on-time delivery of mechanical springs that meet the highest standards set by the manufacturers of such equipment.
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REVIEWS CONTINUED FROM PAGE 123

TRUCK TRAILERS—

California now permits use of 40-ft. semi-trailers. Plastics being tried out for bodies

FROM AN OPERATING standpoint, a tremendous forward step was taken in 1953 when California's vehicle laws were changed to permit the use of 40-foot semi-trailers. This has made it possible to use this length vehicle in all of the Western States.

Considerable publicity has been given to the use of trailers mounted on railroad flat cars for the line haul between San Francisco and Los Angeles, and in various other places in the country, but this so-called "piggy-back" system involves distribution problems which necessitate its being considered an experimental proposition.

General Motors has developed a depressed type flat car for these "piggy-back" movements, and the Baker-Raulang Company has designed a king-size fork-lift truck to lift the trailer onto the depressed flat car. Piggy-back hauling represents a new source of revenue for the railroads and is attractive to some truckers because it is said to cut wear on their rolling equipment.

The teamsters' union originally opposed the procedure on the ground that it reduces the need for manpower. Lately, however, the teamsters have adopted a "wait-and-see" policy toward piggy-back hauling. The union's about-face is said to be occasioned by a recognition that piggy-back hauling might create more short hauls for trucks.

Two interesting developments in trailer equipment appeared in 1953. The first is the more widespread experiments with plastics, as used in trailer bodies. It is too soon to make predictions, but several manufacturers are searching for application of this material. The other development has been a dual purpose vehicle capable of having either a platform body or gondola body. The method of achieving this end varies with the manufacturer, but in any event the change is easily and quickly made by the truck driver.

The ability to safely stop loaded commercial highway vehicles continues to be of major importance. Congested traffic conditions and long grades are the basic problems. Several additional trailer manufacturers announced the availability of larger brakes in 1953.

While refinements and improvements to jigs, fixtures and methods are constantly being made, none of these is in the spectacular classification. Each change is, of course, planned to result in either lower costs or a better product, or both.

New commercial trailer registration figures for the eleven Western States, in percentage terms, using 1948 as 100, are as follows:

Year	%
1948	100
1949	86
1950	128
1951	153
1952	131
1953 (6 months data—expressed as an annual rate)	121

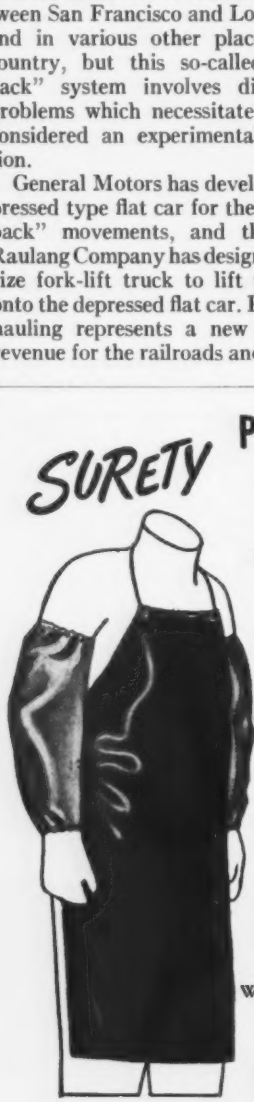
The annual rate for 1953, based upon registration for the first six months, may be somewhat high, since most of the trailer manufacturers in the Western area seem to feel that orders have decreased more than can be attributed to vacations.

Close to 70,000 freight-carrying highway trailers will be constructed in the United States each year from 1952 to 1956, inclusive, it is predicted by Prof. Marvin J. Barloon, of Western Reserve University.

SURETY

Protective Aprons and Sleeves

DEEP-BOND COATING LASTS LONGER



Sureseal synthetic rubber, or Neoprene or Vinyl forced into the warp of strong fabric by Surety's Deep Bond Process.

Tests show greatly improved chemical resistance, longer wear.

Resulting in savings for you in apron and sleeve costs.

Available in both Sureseal synthetic rubber, or Neoprene or Vinyl coated one or both sides, variety of sizes.

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WESTERN DIVISION
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Instantly reads tensile loads applied through hoists, turnbuckles, air pistons, etc. View above shows worker checking strength of welded lugs on bomb racks. Provides valuable test data on machinery or bulky items that cannot be checked in conventional laboratory setup. 13 different capacities from as low as 0-500 lbs. up to 0-100,000 lbs. Portable, light in weight, low in cost. Thousands in use. WRITE FOR PROFUSELY ILLUSTRATED CATALOG AND FREE TENSILE STRENGTH COMPUTER.

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14620 Keswick St.
VAN NUYS, CALIF.
(Suburb of Los Angeles)
Now Made on West Coast

SMALL BOATS—

Construction volume off; foreign competition is appearing

VOLUME of construction in the small boat industry has been falling off during the last two years, but is still a factor of considerable size in the Western economy. Demand is decreasing for several reasons. Fishing fleets, one of the largest sources of demand, have nearly reached fleet level, and rising costs and lack of fish here have cut down demand even more.

Keen competition is being felt from both Holland and England in the pleasure boating field and from France and Holland on fishing boat construction. These foreign countries are able to build with substantially lower material and labor costs.

The following is a run-down on shipyards in Seattle-Tacoma area: Martinac Shipyards presently has contracts to build, for the Navy, 9-AM Class mine sweepers. The first of these will soon be ready for trial. This shipyard also has a sizable wood laminating plant which fabricates wood laminations not only for its own shipyards, but for many of its neighbors.

Petersen Boat Building Co. has sublet its facilities to Bay View Shipyards, which has subcontracted to build two of the AM Class mine sweepers for Martinac.

Puget Sound Boat Building Corp. is completing 25 auxiliary vessels for the Navy. These are 40-ft. personnel boats.

Tacoma Boat Building Co. is under contract to build five 57-ft. MSB-5 Class mine sweepers (two have already been delivered), six 63-ft. Q-type patrol boats (three are nearly done), five 138-ft. AMS Class mine sweepers (one is nearly ready for trials), and three 165-ft. AM Class mine sweepers (one keel has been laid) for the Navy. The Class AM and Class AMS mine sweepers are of the new non-magnetic type.

Pacific Boat Building Co. has five AMS Class mine sweepers under contract, with one nearly ready for trials.

Kazulin & Cole Shipbuilding Corp. has seven 50-ft. personnel boats under construction.

Western Boat Building Co. has no new construction under way and is using its facilities mostly for repair.

Outboard motors

The eleven Western States represent about 13½% of the nation's population and account for about 12% of all outboard motor sales. Sales were about 30% greater last year than in 1952, for the West and the nation.

How Portable AerVoiDs fit into Industrial Feeding

AerVoiD *Vacuum Insulated*
HOT FOOD, SOUP AND COFFEE CARRIERS

Industrial Plants Use AerVoiDs to

- transport hot foods to workers that cannot get to cafeterias without too much loss of production time
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- provide hot foods for night workers after cafeterias are closed
- provide hot foods for increased personnel
- transport hot foods from kitchens to canteens
- provide hot foods for overtime workers
- provide hot foods for outdoor workers
- centralize food production.

PORTABILITY DOES IT!

By providing a means by which HOT FOODS, SOUP, COFFEE can be TRANSPORTED and serviced at a distance from the kitchens where they are produced, AerVoiD Vacuum Insulated Hot Food Carrier do a job in industrial feeding that cannot be accomplished with any other equipment.

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Ways in which AerVoiDs fit into industrial feeding are enumerated at right. Food consultants to help you with any industrial feeding problem without cost or obligation.

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HERE'S AN EXAMPLE

Hot foods, hot coffee on the way to Cannery workers in the field to save time lost bringing workers in for meals.

"We Could Not Justify Using Other Than ELECTRIC TRUCKS"

So says The Leslie Salt Co., users of all types of power in their equipment producing 200,000 tons of salt per year. But handling of packaged salt in their plant is done exclusively by Elwell-Parker *ELECTRIC* trucks. Leslie Salt knows by experience that fume-free E-P electrics are usually less expensive to operate and maintain . . . Elwell-Parker makes trucks with *ALL* motive powers—electric, gas-electric and gas. Each has its advantages under certain operating conditions. For unbiased and *experienced* advice about which is best for your needs, consult Elwell-Parker.

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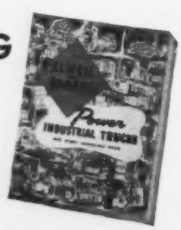

describes over 80 sizes and models of trucks, explains advantages of each type. Write Ira G. Perin Co., 575 Howard St., Dept. W, San Francisco 5, Calif.

West Coast Representative

IRA G. PERIN CO.

San Francisco • Huntington Park

WESTERNERS AT WORK

ARIZONA

Cudahy Packing Co.

L. W. Stringer, formerly general manager of company plant at Phoenix, is elected a vice president. He will be in charge of firm's beef division and will headquarter in Omaha, Neb.

CALIFORNIA

Certified Chrome Furniture Co.

Ben Yoshinaga, formerly this El Segundo firm's purchasing agent, is promoted to position of plant superintendent.

Pastushin Aviation Corp.

Robert G. Gustavson joins Los Angeles concern's Engineering department as projects engineer in charge of jettisonable fuel tanks, external stores, and mechanism design. He was formerly in structures section of North American Aviation, Inc.'s Engineering department, Inglewood.

Turlock Cooperative Growers

Bernard Martinsen, formerly acting manager of this Modesto association, is now general manager. He replaces *Earl Neel,* resigned.

The Garrett Corp.

Edmund L. Ryder is named assistant manager of AiResearch Aviation Service Co., Los Angeles, division of The Garrett Corp. He is replaced as chief engineer by *Frank R. Berry, Jr.,* who is promoted from position of project engineer. *G. S. Williamson,* works manager for Los Angeles and Phoenix AiResearch plants, is elected vice president, manufacturing. *C. W. Reynolds* is elected vice president of public and industrial relations, Garrett Corp. He has been director of public relations and advertising and has had responsibilities of industrial relations.

Northrop Aircraft, Inc.

John R. Alison is elected administrative vice president at Hawthorne, Calif. He has recently been president of Transit Van Corp., Redwood City.

Old Colony Paint and Chemical Co.

Harold C. McClellan, president of this Los Angeles concern, is elected to presidency of National Association of Manufacturers.

H. C. McClellan Old Colony Paint and Chemical Co.

J. H. Lancor, Jr. Consolidated Engineering Corp.

Consolidated Engineering Corp.

James R. Bradburn is named vice president in charge of Pasadena concern's Computer division. He is succeeded, as vice president in charge of engineering, by *Joseph H. Lancor, Jr.,* formerly director of Consolidated's Transducer division. This post is taken over by *Walter B. Claus,* who has held position of director of manufacturing of firm's Transducer division.

Pachmayr Gun Works, Inc.

A. W. Morgan, former Convair executive, is appointed vice president and general manager of Pachmayr Gun Works, Inc. His headquarters will be in Los Angeles.

Marman Products Co., Inc.

L. L. Rice, formerly chief engineer for Lear Engineers, is now a stress and production engineer for this Los Angeles concern.

Marquardt Aircraft Co.

Paul J. Papanek is elected assistant secretary of this Van Nuys jet aircraft concern. Post is in addition to his present position of Eastern district manager. He will continue to headquarter and be in charge of Marquardt's Dayton office.

HIGH PRESSURE CLEAN UP—
Faster, Easier, Cheaper

NOW BEING CLEANED BETTER in less time with less water and work by

Greasy floors, mud-encrusted trucks, transit concrete mixers, power line insulators, coal cars, paper plant rollers and screens, building exteriors, boilers, meat washing, zinc chromate protected aircraft, conveyor belts, and thousands more.

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fmc TRADE MARK

COLORADO

Colorado Interstate Gas Co.

Preston Parks, assistant to vice president in charge of pipeline operations, becomes chief engineer of this Colorado Springs concern. He succeeds *C. B. Abbot,* retired. *William R. Beardsley,* vice president in charge of gas sales, resigns. He joins United Producing Co., Inc., subsidiary of United Carbon Co., as vice president in charge of oil operations in mid-continent and Rocky Mountain areas. His headquarters will be in Kansas.

WASHINGTON

Boeing Airplane Co.

Charles Creswell is named assistant project coordinator in Seattle concern's industrial division, contract-administration department. He was formerly an Air Force captain stationed at Boeing.

Philip F. Spaulding & Co.

A. Gordon May, a turbine and propulsion engineer, joins this Seattle engineering company. He was formerly connected with May & Smith Machinery Works.

Red Cedar Shingle Bureau

Virgil G. Peterson is named secretary-manager at Seattle. He replaces *W. W. Woodbridge,* retired.

Washington Gas and Electric Co.

B. T. Poor becomes concern's general manager. He replaces *K. P. Fisher,* resigned.

Alaska Steamship Co.

D. E. Skinner, formerly general manager and vice president, is elected president and general manager of Seattle company. He succeeds *G. W. Skinner,* deceased. *R. J. Behnke,* formerly treasurer, is elected vice president and treasurer.

ASSOCIATIONS ELECT

Northwest Mining Assn.:

President, *Karl W. Jasper* of Spokane, Wash., president of Grandview Mines; vice presidents, *Robert E. Sorenson* of Wallace, Idaho, vice president of Hecla Mining Co., and *P. Evan Oscarson,* Spokane, consulting geologist; secretary, *Robert J. Towne,* Spokane, president of Towne Equipment Co.; and treasurer, *E. K. Barnes,* Spokane, executive vice president of First National Bank.

American Chemical Society, Southern Arizona Section:

Chairman, *Dr. Mitchell G. Vavich,* University of Arizona.

Furniture Manufacturers Assn.:

President, H. E. Toor, Furniture Guild of California; vice president, Irving Harris, Harris Furniture Manufacturing Co.; treasurer, Joseph Siskin, Angelus Furniture Manufacturing Co.

Consulting Engineers Assn. of California:

President, Mark Falk of Falk & Booth, San Francisco; executive secretary, Pecos H. Calahan, formerly executive secretary of California State Board of Registration for Civil and Professional Engineers.

. . . More on page 148

you play it SAFE with Safety-Pulls

Just as important as the time- and labor-saving advantages of Coffing Safety-Pull Ratchet Lever Hoists is the way each one protects your men from injury . . . your equipment from damage. Here's why:

Load cannot slip even if handle is accidentally released — because of dual Ratchet and Pawl principle, developed by Coffing and an outstanding Coffing advantage for over a quarter of a century.

Load is held positively at all times — there is no friction brake to slip or freeze.

Hooks will not break or straighten out.

"Safety-valve" handle will bend before any other part of hoist gives way.

Safety-Pulls are single-chain tested at 100 percent above warranted, rated capacity.

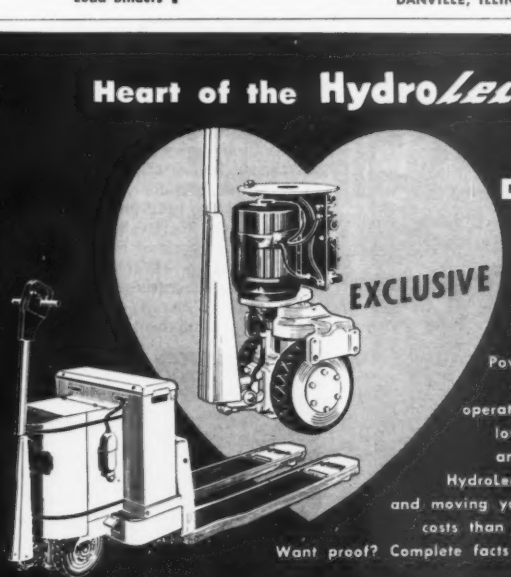
Find out more about how Coffing Safety-Pulls provide extra protection on the job. Write for Bulletin WI1SP.

Coffing Safety Pull Ratchet Lever Hoists
2 coil chain models, ¾ and 1½ tons
10 roller chain models, ¾ to 15 tons

Quik-Lift Electric Hoists
Hoist-Alls • Mighty-Midget Pullers
Spur-Geared Hoists
Differential Chain Hoists
I-Beam Trolleys
Load Binders

COFFING HOIST COMPANY
ORIGINATORS OF RATCHET LEVER HOISTS
DANVILLE, ILLINOIS

Heart of the HydroLectric



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THE DYNA-DUAL POWER UNIT

This sturdy Dyna-Dual Power Unit out performs all others for ease of operation — dependability — lowest maintenance cost and economy of power. HydroLectrics will keep rolling and moving your materials at lower costs than any truck in its class. Want proof? Complete facts and data on request.

Note: The Dyna-Dual Power Unit is interchangeable on all models.

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TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Harman Assoc. in Los Angeles

George Schroeder is appointed Western sales representative of F. Ward Harman Associates of Halesite, Long Island, New York. The line consists of plant layout equipment such as Temprints and three-dimensional scale models for laying out in advance modern industrial plants. Mr. Schroeder will headquarter in Los Angeles and serve industry in California and Arizona.

Jorgensen Steel picks officers

Following appointments are made in slate of officers at Earle M. Jorgensen Co., Los Angeles: Elwood M. Smith, former secretary-treasurer and comptroller, becomes executive vice president; Charles Schriber, vice president and manager of sales at Los Angeles plant, is named senior vice president and will continue present duties; George A. Day, who has previously held posts of credit manager in company's Los Angeles and Dallas plants, and assistant credit manager at Oakland plant, is named to fill newly established office of treasurer; former assistant secretary John F. Watkins is moved up to secretary; new comptroller is S. Monte Robinson, CPA, who has been assistant comptroller.

Top men at Maltby

Fred C. Warren, general sales manager of Edward D. Maltby Co., Inc., Los Angeles, is elected president of this firm. He has been with Maltby over 25 years and, as president, will concentrate his activities in sales, factory relations, sales and engineering policies and their administration. Philo J. Harvey, presently vice president, is elected executive vice president, to head financial and business administration. He is also named executor and trustee of estate of Edward D. Maltby, recently deceased. Maltby Co. is representative for manufacturers of ball, roller and needle bearings, chains, oil seals and power transmission equipment.

F. C. Warren
Edward D. Maltby Co., Inc.

E. A. Allen
New Hampshire Ball Bearings, Inc.

Allen heads branch office

New Hampshire Ball Bearings, Inc., Petersborough, N. H., opens new stock-carrying branch office in Los Angeles, headed by Elliott "Micro" Allen, who has represented firm for many years in the West. His headquarters are now 4809 Hollywood Blvd., Los Angeles. Warehouse will stock for immediate delivery company's line of "Micro" precision instrument ball bearings.

Mackesy awarded scroll

John Mackesy, technical service representative in San Francisco for Oakite Products, Inc., receives D. C. Ball Distinguished Service scroll, one of five fieldmen throughout the country so recognized by company for exceptional service to industry. Award is made by John A. Carter, president of firm, at regional technical-sales conference in San Francisco. Oakite manufactures industrial cleaning and related materials.

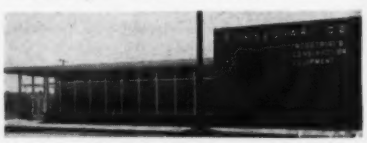
Moss heads Western division

P. E. Moss, district manager of Goodall Rubber Co. in Salt Lake City, is named Western division manager, directing operations in 11 Western States for this Trenton, N. J., firm. He will continue as district manager as well. Burford Peck, office manager of the Salt Lake district, is named assistant district manager. Mr. Moss, who began with company's Salt Lake office in 1938, assumes duties of R. J. Goehring, deceased.

Joins Helipot Corp.

David C. McNeely, who was formerly sales manager of Philadelphia Gear Works, Philadelphia, is appointed national sales manager of Helipot Corp., a division of Beckman Instruments, Inc., South Pasadena, Calif.

Modern plant for Fornaciari



Fornaciari Co. moves to new 11,000 sq. ft. plant in Los Angeles. Specially equipped with air filtering and pressurizing system for stock and display rooms, new building permits dust-free storage of construction and industrial equipment handled by this distributor. Shop facilities are departmentalized and provide engine testing and steam cleaning equipment as well as a bridge crane. Manufacturers represented by Fornaciari include Barco, Link-Belt, Buda, Blackhawk, and others.

Add welding products line

U. S. Steel Supply division, U. S. Steel Corp., is named West Coast distributor for welding products of A. O. Smith Corp., Milwaukee, Wisc. Warehouse in San Francisco will furnish direct service to Northern California customers on full stock of welding electrodes. Line also includes welding machines and accessories.

Oregon dealer for MAGCOA

F. E. Bennett Co., Portland, Ore., adds complete line of materials handling products manufactured by Magnesium Company of America, East Chicago, Ind.

Los Angeles assignment

Robert C. Herrick is assigned to post of sales representative in Los Angeles district office of Allis-Chalmers Manufacturing Co.

He has been with company's processing machinery department for past several years.

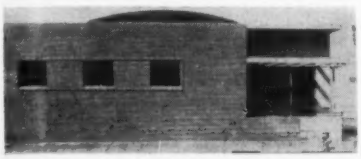
A-C names Eddy Electric

W. H. Eddy Electric Products, Inc., Phoenix, is appointed distributor for Allis-Chalmers transformers in state of Arizona and part of New Mexico. W. H. Eddy is president and F. J. Carrigan secretary-treasurer of the concern, which was established in 1947.

SKF warehouse opens

SKF Ball and Roller Bearings opens new district office and warehouse at 790 Tennessee St., San Francisco, which will serve California, Nevada, Utah and Territory of Hawaii. New building houses firm's office formerly located at 979 Bryant St.

Bellows Co. expansion



The Bellows Co. of Calif. moves into these new headquarters at 2001 S. Grand Ave., Los Angeles, which provide 5,000 sq. ft. of space for sales and engineering activities. Factory will be maintained at old location. Bellows, which has its home office in Akron, O., sells Controlled-Air-Power devices, including drill press feeds, air vises, valves and cylinders and machine tool accessories.

Open house at Lindberg

Official hosts at the open house held by Lindberg Steel Treating Co., Los Angeles, for their new heat treating plant, were (left to right): A. U. Uitti, manager, Chicago; H. G. Magnussen, vice president and sales manager, Chicago; E. A. Sommer, general chief engineer, Chicago; Robert W. Fish, manager, Los Angeles plant; W. B. MacNerland, Chicago; Roy Lindberg, president, Chicago; J. Stanley Skoglund, manager, St. Louis; K. U. Jenks, secretary and comptroller, Chicago; Norman O. Kates, chief metallurgist, Chicago.

New welding engineer for Westinghouse

Lawrence C. Sheaffer becomes North Pacific District welding application engineer for Westinghouse Electric Corp. and will make his offices at company's Seattle headquarters. Mr. Sheaffer has been a salesman for Seattle Marine and Fishing Supply Co.

Represent Eastern firm

Pacific Scientific Co., with offices in Los Angeles, San Francisco, Seattle and Portland, adds line of induction heating equipment manufactured by Weltronic Induction Heating Corp., Detroit.

Humphrey succeeds Strong

I. W. Strong, former Denver sales representative of Appleton Electric Co., is appointed assistant to the vice president in charge of sales at its home office in Chicago. New district sales manager for the Denver area is James M. Humphrey, electrical engineer, who was previously with Young Electric Manufacturing Co. of Denver.

Salt Lake office for Chicago Bridge and Iron

Chicago Bridge & Iron Co. opens sales office in Salt Lake City, headed by J. Graham Daniels, who has transferred from Tulsa, Okla. Company's other sales offices in West are at San Francisco, Los Angeles and Seattle.

Clogston and Dabb join Acme Steel

Carl Clogston and Wayne Dabb are named sales representatives in West for Acme Steel Products Division, Acme Steel Co., Chicago. Headquarters for Mr. Clogston will be Eureka, Calif.; for Mr. Dabb, Salt Lake City. Both men have completed an intensive training course in packaging, shipping and

SNUG and SECURE

We might modestly say we've even improved upon nature's methods of protection. We present

BERGER MANUFACTURING DIVISION REPUBLIC STEEL CORPORATION

• STEEL STORAGE CABINETS

Construction of heavy gauge steel — reinforced for lifetime service

Workmanship is the finest — making the unit an enhancement for any office

Attractive baked-on enamel finish provides a most pleasing appearance

Cabinets furnished in either storage, wardrobe or combination models

Available for quick delivery from local stocks.

OTHER BERGER PRODUCTS:
Steel shelving, tool room equipment, files, office desks, tables, work benches, shop desks.

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Increase loading capacity over present levels, without adding a single new facility! Meet the demand for stepped up shipping and receiving flow by installing Magliner dock boards. Of all-magnesium construction, these low-cost units are easily handled by one man . . . capacity rated to handle the heaviest of loads and equipment! Establish a rapid transit bridge-link from freight carriers to plant—keep materials and merchandise moving on schedule! Get the facts on Magliner dock boards today. Available in 34 standard models, or custom engineered to exact specification.

MagLiner
MAGNESIUM DOCK BOARDS

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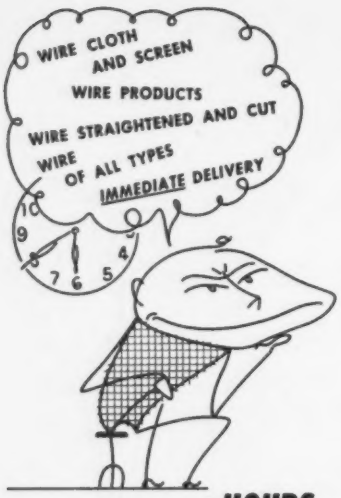
W. T. Billard, Inc., Los Angeles; Equipment Supply Co., Salt Lake City, Utah; Hathaway-McCartney Engr. & Supply Co., Denver Colo.; Lift Truck Service Co., Spokane, Wash.; Material Handling Equip. Co., Inc., Seattle, Wash.; Oregon Handling Equip. Co., Portland, Ore.; Hamerslag Equip. Co., San Francisco.



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materials handling conducted at company's general offices in Chicago. Mr. Clogston was previously with California Barrel Co., Ltd., of Arcata, Calif. Mr. Dabb served in field of public and employee relations at United States Government Arsenal, Ogden, Utah.

Ziegler appointments

Charles A. Tuchschmidt is appointed sales representative in state of Arizona for Ziegler Steel Service Corp., Los Angeles. Donald W. Johnson receives appointment for state of Oregon and southern Washington.

Stryco Sales adds line

Stryco Sales, Inc., Albuquerque, N. M., is appointed sales representative for Nutting Truck and Caster Co., Faribault, Minn. Stryco will handle complete Nutting line of floor trucks, casters and wheels in state of New Mexico and Western Texas.

In charge of new Rucker product

Don T. Whalen is named to handle sales of automatic drum filler, product of Rucker Co., Oakland, Calif. Formerly San Francisco district manager of Richfield Oil Corp., Mr. Whalen will make his headquarters in Oakland. Rucker Co., manufacturer of fluid power systems, recently introduced this hydraulically-operated drum filler, a new development in field of packaging equipment.

Reno distributor

Osborne and Dermody Supply Co., Reno, is appointed distributor of Westinghouse electrical apparatus in Reno and Las Vegas areas. John A. Dermody is president and R. L. Osborne, Jr., vice president and general manager of firm, which also has a Las Vegas branch.

U. S. Steel man

W. O. Viery is appointed manager of commercial sales of U. S. Steel Products Division of U. S. Steel Corp., with headquarters in Los Angeles. Formerly assistant manager of commercial sales, he has also served as resident salesman for San Diego and Orange counties, with additional territory of Imperial County and Arizona. In his new position Mr. Viery succeeds Alfred E. Skinner, deceased.

W. O. Viery
U. S. Steel Corp.

R. I. Kern
Miniature Precision Bearings, Inc.

To manage West Coast branch

Miniature Precision Bearings, Inc., appoints Richard I. Kern to head its new branch plant at Santa Barbara, now under construction, and carry out market development program. Mr. Kern, who was formerly with Marketing and Research Department of Firestone Tire and Rubber Co. and also held administrative sales post with Atwood Vacuum Machine Co., has begun his duties on the West Coast with a tour of industrial centers to get acquainted with MPB markets. Company's main plant is at Keene, N. H.

ASSOCIATIONS ELECT

. . . Begins on page 145

National Potato Chip Institute, Western Regional Div.

President: *Kimball J. Cranney,* vice president of Clover Club Foods Co., Kaysville, Utah.

West Coast Electronic Manufacturers Assn.:

Chairman, *E. P. Gertsch,* president of Gertsch Products, Inc.; vice chairman, *Richard G. Leitner,* chief engineer, Packard Bell Co., and secretary-treasurer, *Gramer Yarborough,* vice president of American Microphone Co.

Inland Empire Waterways Assn.:

Vice president for State of Washington, *Norman L. Krey,* Spokane, Wash., manager of Northwest operations for Kaiser Aluminum and Chemical Corp.

California Lamp and Shade Manufacturers Assn.:

President, *L. R. Barbley,* co-owner of Betty-Lee Copper House, Inc.; vice president, *S. Smith,* Coronet Manufacturing Co.; treasurer, *Harold Singer* of International Lamp Co., and secretary, *S. Genser* of Royalite Co.

Los Angeles Chapter of Representatives, Inc., affiliated with Electronic Products Manufacturers, Inc.:

President, *George Davis,* formerly vice president; vice president, *A. J. Rissi,* formerly secretary-treasurer; and secretary-treasurer, *Frank A. Emmet.*

California Fertilizer Assn.:

President, *Beverly H. Jones,* president of Sunland Industries, Fresno; vice president, *William E. Snyder* of Wilbur-Ellis Co., Los Angeles; secretary and treasurer, *Jack Baker* of Bandini Fertilizer Co., Los Angeles; executive secretary and manager, *Sidney H. Bierly* of San Marino.

National Assn. of Corrosion Engineers:

Chairman, *Robert H. Kerr* of Southern California Gas Co.; secretary-treasurer, *R. E. Hall,* Union Oil Co. of California.

MILLER-ROBINSON CO.

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Price $25,000
Write Owner, R. T. DIXON
1625 Naud St., Los Angeles, Calif.

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New FOR MANUFACTURERS
Inventor-Idea man, aggressive, capable, age 41, practical and sincere. Not graduate engineer, but broad mechanical experience with natural inventive talents. Can create, design and build own models. Several original marketable items under way now including wheel goods, yard toy, and punch press production products.
Desire outlet for my services, and items under contract or retainer basis with group of five established medium size manufacturers in non-competitive fields. Southwest locations preferred. Profitable possibilities for concerns desirous of new, original quality products.
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FLEXIBLE CRANES unload box cars

A RECENT installation of overhead cranes at Perry Kilsby, Inc., Los Angeles, presents an unusual application providing greater flexibility to the service of the crane.

The cranes, installed by the CraneVeyor Corp., Los Angeles, consist of two 3-ton capacity cranes having a span of 47 ft. Hoists have a special swivel base permitting them to be turned in any direction on a 280-deg. radius, thereby providing much more flexibility in the operation.

The important advantage of the swivel base is that it permits the load to be pulled with the grooving of the hoist drum at all times. A locking mechanism is installed so that the hoist may be secured in several positions for each lifting operation.

This type of installation is adapted to unloading box cars and for handling material such as light tubing and bar stock stored in racks. It is not, however, recommended for heavy materials such as "I" beams or machinery that must be skidded across the floor.

This is the first installation of its kind ever made by CraneVeyor and results in faster operations.

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Practical, Down-to-Earth Welding Rods
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THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS,

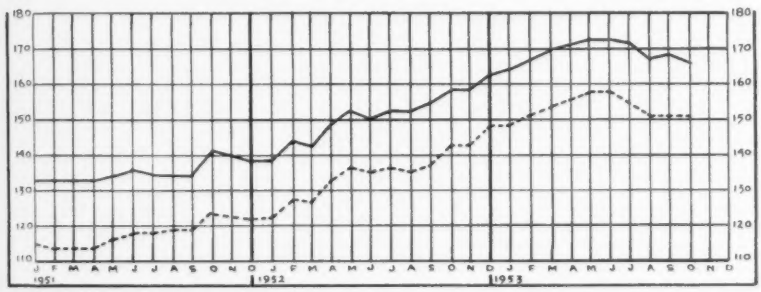
DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

WESTERN BUSINESS INDEXES . . .

California . . .

(Wells Fargo Bank & Union Trust Co., San Francisco)

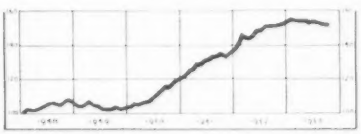
Weighted average of five seasonally-adjusted economic series. Percentage weights are: manufacturing payrolls, 35; department store sales, 20; motor fuel sales, 20; bank debits, 15; engineering construction awards, 10. Black line: current dollars. Dotted line: 1947-1949 dollars. 1947-49 average = 100. Developed by Stanford Research Institute.



Arizona . . .

(Valley National Bank, Phoenix)

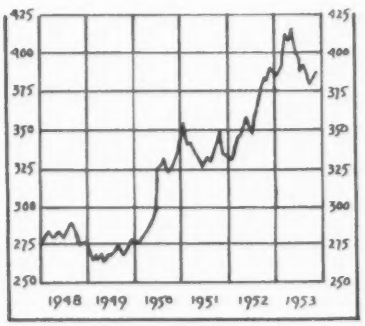
Weighted composite of retail sales, agricultural income, employment in mining, manufacturing and construction, seasonally adjusted. 1949 = 100.



Southern California . . .

(Security-First National Bank of Los Angeles)

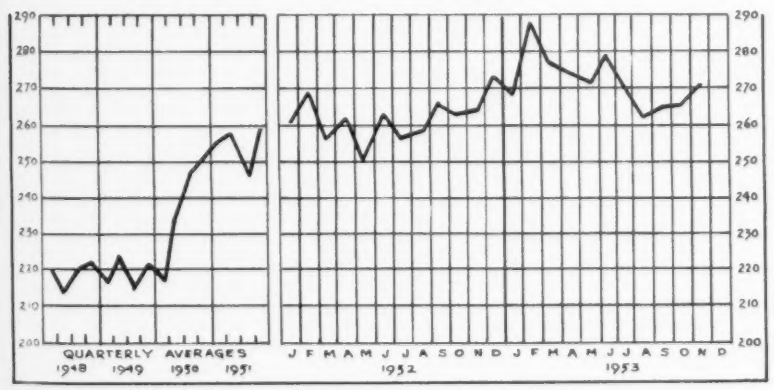
Weighted average of ten seasonally adjusted business series, percentages of which are: department store sales, 15; building permits, 5; Los Angeles bank debits, 20; residential city bank debits, 5; agricultural city bank debits, 5; industrial employment, 20; industrial power sales, 13; railroad freight volume, 6; telephones in use, 7; real estate sales activity, 4. 1939-40 = 100.



Pacific Northwest . . .

(Bureau of Business Research, University of Washington)

Weighted composite of weighted composite indexes of three areas: Puget Sound, Inland Empire, Lower Columbia. 1947-1949 = 100.



PUMPS—

SPRINKLER irrigation is giving a new impetus to the sale of pumps in California, Colorado and the Pacific Northwest, particularly because it permits irrigation of rolling land which would be too expensive otherwise.

Accurate supplemental irrigation, made possible by use of sprinklers, saw them come into use for practically every crop grown in the West in 1953. While turbines are used in many cases to lift the water originally, centrifugals are also employed as boosters along the line.

Sprinkler irrigation is becoming so widespread that a national association has been formed. Most of the manufacturing and design facilities are located in the West, with at least two big sprinkler head manufacturers, 12 or more coupling makers, several tube manufacturers and a major tube supplier. Lowering water tables in the Southwest are jumping demand for bigger horsepower turbines.

A section of the January 1954 issue of **WESTERN INDUSTRY**—609 Mission Street, San Francisco 5, Calif.

THREE TIMES AS BIG—Air view of new home in Gardena, Calif., of Seaboard Coil Spring Division, Associated Spring Corp., showing main plant in foreground and hot wound plant in background. New quarters provide 90,000 sq. ft. area, three times as large as former plant. Seaboard Coil Spring, which was organized in Los Angeles in 1936, merged with Associated Spring last year. Division specializes in small-quantity orders for research, in addition to mass production of springs.

ARIZONA

EXCELSIOR—New 15,000 sq. ft. plant for Western Wood Excelsior Manufacturing Co. is completed in Phoenix. Plant is seventh in West run by corporation headed by D. B. Roesner, Los Angeles. It will employ 100 people when full production is reached in June. Operations will use aspen from Northern Arizona and Colorado, and excelsior product will be supplied to evaporative cooler and other industries.

PHOENIX INDUSTRY GROWS — Report by Phoenix Chamber of Commerce Industrial Committee shows 130 new manufacturers began operations in city between March 1948 and December 1953. Total employment at these plants is over 7,400.

BEE MOLD—New firm, Bee Mold and Die, Inc., will begin production in Phoenix of metal and rubber molds and dies. Organized by owners of Facs Products, Inc., of Chicago, firm will employ between 30 and 50 skilled tool and die designers and a few machinists. Equipment valued at about $200,000 is being installed in leased quarters. Firm plans to build factory within a year or two.

JET TESTING — AiResearch Manufacturing Co. is awarded contract for construction of a $4,150,000 jet turbine testing plant in Phoenix, planned to be in operation by January 1, 1955.

SPECIALISTS FOR HIRE—Arizona Research Consultants, Inc., is organized for $1,000,000 in Phoenix and will offer services of professional scientists in development and analysis of products and technical research of all kinds. Incorporators are Michael J. Sullivan, John T. Long and George G. Olson.

CASTLE DOME CLOSES—Castle Dome copper mine, subsidiary of Miami Copper Co., is shut down because of ore exhaustion. All 500 employees will be employed to move equipment to Copper Cities mine (formerly the Sleeping Beauty, and now being developed at a cost of $14,000,000), which is scheduled to begin production early in 1955.

TUNGSTEN MILL—Standard Tungsten Corp., of New York and Taipeh, Formosa, will build 150-ton tungsten mill on five-acre site bought from Kramer Mining & Milling Co., in Pomerene, where a pilot plant has been in successful operation for the past three months. Mill will serve five mines in Arizona and New Mexico operated by Standard, an international mining, milling and trading firm. Henry G. Grundstedt is in charge of Standard's development program in area; James Baize will supervise construction of mill.

CALIFORNIA

WATER BOILER—California Research & Development Co. places in operation nuclear chain reactor or pile at Livermore, Calif., research facility of Atomic Energy Commission. Known as a "water boiler," reactor was built by North American Aviation, Inc., and will be used in research program. It is first to be constructed and operated in this area.

ADD LAND—Hydro-Aire, Inc., Burbank aircraft accessories firm, buys additional ten acres near its main plant, which will be used to expand and consolidate company's turbo-machinery research and development, and production of aircraft fuel booster pumps. Hydro-Aire now operates six plants in this area.

ORANGE COUNTY GIANT—Construction begins on first unit of new $8,000,000 plant for U. S. Electrical Motors, Inc., in Anaheim. Unit will be used by company's Defense Products Division for building aircraft electrical motors.

NEW REFINING PROCESS—Union Oil Co. will use newly developed "Unifining" catalytic refining process in its Oleum refinery, Contra Costa County, to be built this year by C. F. Braun & Co. of Alhambra. Unifiner will process 15,750 bbl. a day of high-sulfur, high-nitrogen crude distillates. Intermediate product is converted by conventional catalytic cracking into high octane gasolines. Union will license new process to the industry through its Commercial Development Division.

WESTERN ASSEMBLY PLANT—Flex-O-Tube Division of Meridian Corp., Detroit, opens new assembly plant in North Hollywood, to be managed by L. W. Lewandowski, formerly firm's chief engineer.

MOVE TO LYNWOOD — California Chassis Co. moves plant from South Gate to Lynwood, where it occupies new 10,000 sq. ft. plant for production of sheet metal items in electronic field, including chassis, brackets, panels and utility cabinets. Two acres adjoining plant have been purchased for future expansion.

LANSING EXPANDS—James B. Lansing Sound, Inc., Los Angeles, moves its offices, laboratory, warehouse and related operations into new building adjoining present plant, which will be devoted entirely to production. Total area now available is 12,000 sq. ft. Firm manufactures speakers, units and systems.

SPEED-UP—Calaveras Cement Co. approves $328,000 improvement program for its San Andreas plant, calling for addition of new lightweight bulk cement trains to its transport fleet, a changeover in sack-loading equipment, modernization of materials handling facilities and purchase of equipment to improve burning efficiency of plant's four kilns. A new rotary drill will be added to quarry machinery and a motor grader placed in service for maintenance of company roads. Further changes, estimated to cost $210,000, are being studied and may be scheduled for next year.

TRAINING CENTER—General Motors Corp. buys 6¾ acres of land in San Leandro for construction of one of its training centers, to be located throughout the country. Providing shop class-

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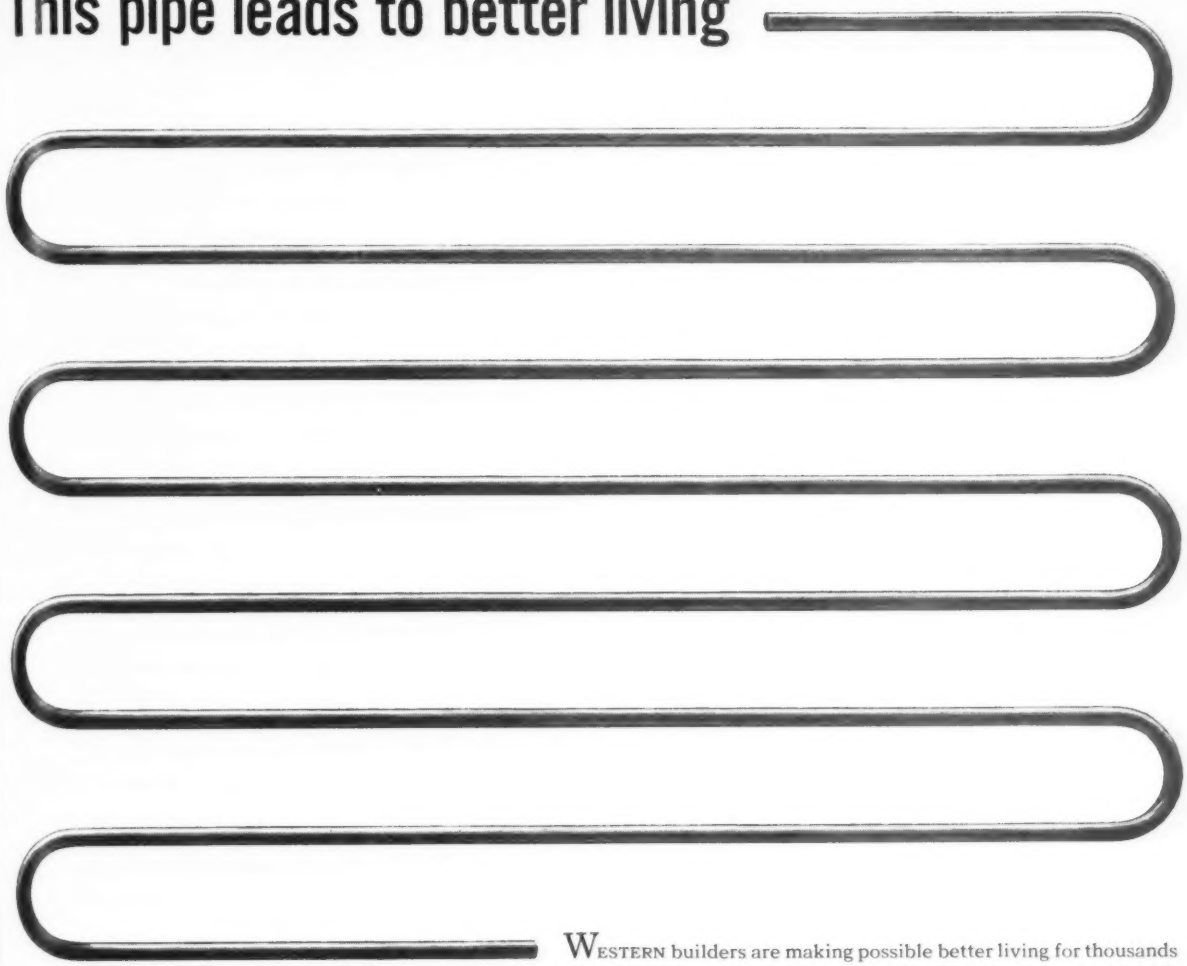
This pipe leads to better living



WESTERN builders are making possible better living for thousands of new home owners by installing radiant heating—much of it with Kaiser Steel pipe.

Radiant heating gives even, healthful temperatures in every room. It is exceptionally clean and safe. When Kaiser Steel pipe is used the grid system is so durable that it far outlasts the normal life of the house.

Steel pipe has become essential in nearly all modern construction—for plumbing, heating, ventilating, structural supports—and even for TV antennae poles.

The diversified line of steel pipe and other steel products produced by Kaiser Steel means that the great western building industry has a nearby, dependable source to help meet its many needs.

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • ingot molds • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

rooms, auditorium and conference rooms, kitchen and cafeteria, training center will offer instruction in service methods and technological advances to General Motors service personnel and mechanics.

NAME CHANGE—Royal Heaters, Inc., Alhambra, changes firm name to Royal Jet, Inc. Firm, which manufactures gas heating equipment, also builds wing tanks for F84-F Thunder Jet fighter plane.

LOUDSPEAKER SUBSIDIARY — Ampex Corp., manufacturer of magnetic recording equipment, forms wholly-owned subsidiary, Ampex Loudspeaker Co., North Hollywood. Company's initial output will be theatrical loudspeakers, built under license from James B. Lansing Sound Corp.

BENDIX BUILDS — Bendix Aviation Corp., North Hollywood, begins construction of new engineering building for its Pacific division's expanded airborne and hydraulic engineering departments.

AIR FORCE ORDER—Bill Jack Scientific Instrument Co., Solano Beach, receives $9,395,000 contract from Air Force for construction of airborne analog computer systems, used to control camera operations in high-speed, high-altitude reconnaissance aircraft.

EXPANSION PROGRAM—Natural Gas Equipment, Inc., manufacturer of gas burning and regulating equipment, moves into new and larger quarters in Pasadena. Company within several months will reportedly effect merger with Wilgus Manufacturing Co., Los Angeles, now its exclusive sales outlet. Plans are also in progress for opening branch office in Northwest, soon to be supplied with natural gas fuel.

NEW SANTA CLARA PLANT—Keasbey & Mattison Co.'s new $2,750,000 plant at Santa Clara, Calif., occupies 26-acre site and provides total plant area of 182,300 sq. ft. Plant produces Century asbestos-cement pressure pipe.

BUILD COTTON MILL—Group of Bakersfield businessmen successfully complete negotiations to bring cotton textile mill to Bakersfield from Orange, where it has been operated by Coast Cotton Mills. Construction of building has begun, and equipment will be transported to new site by December 15. Production of materials used in carpet manufacturing will be continued. Initial employment will be 160 persons on three shifts, which will increase as operations are enlarged into other phases of cotton processing.

NORTHROP LICENSE—Northrop Aircraft, Inc., Hawthorne, awards exclusive license to E. H. Stau Co. of Los Angeles to manufacture and market Northrop-developed anchor nut holder used in assembling structural parts.

SKYRAY HANGAR—Douglas Aircraft Co., Inc., El Segundo Division, completes $1,500,000 hangar and flight test building at Los Angeles International Airport for final work on production models of bat-winged F4D Skyray.

MODERN *air fluid* POWER

SERIES DU-
LOW PRESSURE HYDRAULIC PUMPING UNIT
Recommended For Equipment *Modernair*

- 200 PSI
- 2½ GALLONS PER MIN.
- 5 GAL. RESERVOIR WITH AIR BREATHER
- 115/230 VOLT A.C. 1/3 HP MOTOR WITH CAPACITOR
- WEIGHT: 35 LBS.

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work hand in hand for GREATER PROTECTION

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Building, 160 x 300 ft. in size, houses offices and has floor space to accommodate 20 Skyray planes simultaneously. Kistner, Wright and Wright, Los Angeles, prepared plans; general contractor was Al-Co Construction Co.

PLASTIC PIPE FOR EUROPE—Reflin Co., Los Angeles, licenses Societé des Fonderies de Pont-a-Mousson of Nancy, France, to manufacture glass-fibre reinforced plastic pipe in France, Belgium, Germany, Spain, and Cuba. Reflin will supply engineering and technical information.

ARTHUR D. LITTLE, INC.—This widely known Boston research and consulting organization opens Western regional office at 114 Sansome St., San Francisco. Christian J. Matthew in charge, with Richard Newhall, formerly of Oronite Chemical, as associate.

BUY BERKELEY FIRM—American Brake Shoe Co., New York, buys inventory, tools and machinery of Leader Welding and Manufacturing Co. of Berkeley. Complete Leader line of welding equipment will be sold by American Manganese Steel Division of purchasing company, through its Welding Products Department.

DIESELIZING—Union Pacific Railroad plans to dieselize through traffic on its main line between Omaha and Pacific Coast, and places order for 205 diesel locomotive units, at a total cost of $35,769,410, to be delivered by June 1, 1954. Order, placed with Electro-Motive Division of General Motors Corp., is for 190 freight and 15 passenger locomotive units.

ORDER AIRCRAFT—Aviation Equipment Corp. orders from Lockheed Aircraft Corp., Burbank, three Super Constellations equipped with new Curtis Wright turbo compound engine, for delivery in August. Aircraft will be leased to Seaboard and Western Airlines, Los Angeles, an all-freight carrier.

SECOND AMMONIA PLANT — Shell Chemical Corp. begins production of anhydrous ammonia from natural gas at its new $10,000,000 plant in Ventura. Plant has productive capacity of 150 tons a day and will employ about 140 persons, headed by Frank D. Kuenzly, plant manager, who was formerly superintendent of Shell's ammonia plant at Pittsburg.

ALADDIN IN SAN LEANDRO—Aladdin Heating Corp., Oakland manufacturer of heating, ventilating and air-conditioning equipment, starts construction of new plant in San Leandro. Four main buildings, totaling 82,000 sq. ft. of roofed area, and 1¼ acres of concrete slab for parking and truck operation, on which future units will be built, are included in present plan. When all units are completed, total work area will be 150,000 sq. ft. and 8,400 sq. ft. of office space.

CITRUS JUICE PLANT — Paramount Citrus Assn., San Fernando, may build $400,000 lemon juice plant at Santa Barbara, provided support of growers in that area is obtained.

RECONDITIONING JETS—Aircraft Engineering and Maintenance Co., Oakland, is awarded $2,000,000 contract for reconditioning Air Force T-33 trainers,

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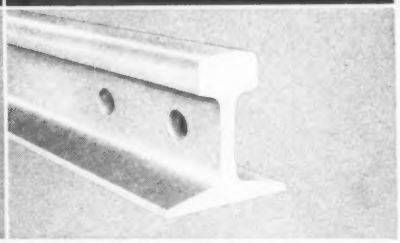
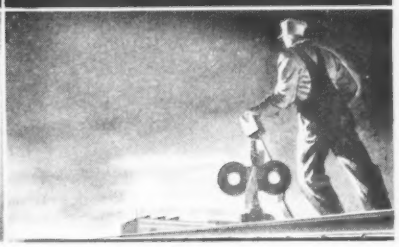
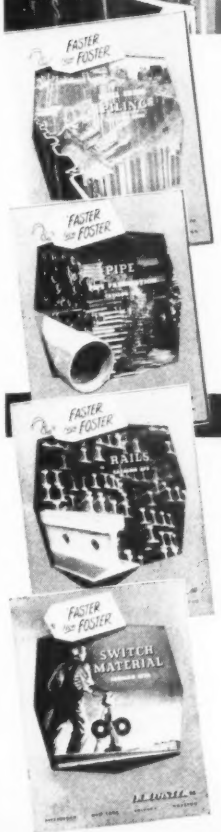


PILING

TRACK NEEDS





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reportedly first contract in jet propulsion to be awarded a Northern California firm. Work, to be performed at Oakland Airport location of company, will employ over 400 persons.

NEW POP PLANT—Construction begins on 75,000 sq. ft. plant in Compton for Can-A-Pop Beverage Co. of California, subsidiary of Sheridan Brewing Co. Plant and equipment will cost about $1,250,000. Operations are scheduled for March 1, with capacity of over 10,000,000 cases a year.

FREEZER EXPANSION — California Berry Freezers, Inc., expands operations under new name of California Farm Products and moves to new plant at 423 Salinas Road, Watsonville.

WESTVACO REMODELED—Food Machinery and Chemical Corp, sets up two separate operating divisions within its Westvaco chemical organization: a chlor-alkali division and a mineral products division. Products of plant at Green River, Wyo., will come under former, and plants at Modesto and Newark, Calif., and Pocatello, Idaho, under latter division.

CONSOLIDATE—To streamline company organization under one name, Pacific Gear & Tool Works, San Francisco, is consolidated into Western Gear Works, Lynwood.

PLANT ACQUISITION—H & B American Machine Co., Chicago, acquires plant and equipment of Tyler Machine Co., Culver City.

LEASE PLANT IN SAN JOSE—E. W. Bliss Co. of Canton, Ohio, leases 62,500 sq. ft. plant of Moore Industrial Co., San Jose, to establish a Western branch for manufacture of mechanical and hydraulic presses, can and container machinery, industrial hardware and ordnance equipment.

BUY ACME—Liebmann Breweries, Inc., New York, maker of Rheingold beer, buys Acme Breweries, San Francisco and Los Angeles, for a reported figure of around $6,000,000 and plans to expand both plants.

MISSILE TEST EQUIPMENT — Electronic Engineering Co. of Calif., Los Angeles, receives Air Force contract in excess of $300,000 for design, fabrication and installation of additional guided missile timing equipment at Air Force Missile Test Center near Cape Canaveral, Florida.

ALUMINUM ATTRACTS COPPER—Kaiser Aluminum & Chemical Corp. sells $16,250,000 of new series of preferred stock to Kennecott Copper Corp., completing program of financing Kaiser Aluminum's $230,000,000 construction program begun in 1951. Kennecott also purchases for investment 100,000 shares of Kaiser Aluminum common stock from company's founders, General Construction Co., J. F. Shea Co., Pacific Bridge Co., and Henry J. Kaiser Co.

OPEN WEST COAST PLANT—Two-day dedication ceremonies celebrate opening of Cantrell & Cochrane Corp.'s soft drink plant in Los Angeles. Firm, which opened its first plant in Englewood, N. J., four months ago, will supply eleven Western States, Hawaii and the Philippines with soft drinks in cans from this Western branch.

COLORADO

INFORMATION SERVICE—Economic Research Council of Denver is organized to collect, analyze and publish statistics on business and economic development in Denver area, services which will be supported by subscription fees of members. Newly elected officers are: council chairman, George E. Hawkins, chief statistician for Mountain States Telephone & Telegraph Co.; vice chairman, Lloyd A. Garrison, dean of University of Denver's graduate college; executive director, F. L. Carmichael, director of university's Bureau of Business and Social Research; and secretary-treasurer, Angelos Theodorides, professor of economics and statistics, U. of Denver.

MOVING IN APRIL — Stearns-Roger Manufacturing Co., Denver, plans to occupy its new $2,000,000 office building on April 1. Five-story building will permit consolidating Denver operations, now in several buildings, under one roof. Company is engaged in design, engineering and construction of power plants, metal and chemical industry plants, and other industrial construction.

BUY URANIUM CLAIMS—Four Corners Uranium Corp., headed by E. H. Sanders of Denver, purchases 191 uranium claims in southwest Colorado from State Senator D. Lew Williams and associates, at a price of over $1,000,000. Three operating uranium mines are on the claims. Sellers will become stockholders in Four Corners company, which holds uranium and oil and gas leases in Green River, Utah, and Lander, Wyo., areas.

IDAHO

PRIVATE POWER PROJECTS—Five Pacific Northwest power companies ask approval of Federal Power Commission to a preliminary study of two hydroelectric projects on Clearwater River in Idaho. Proposed dams would be built at Bruces Eddy and Penny Cliffs sites, provide 536,000 kw. of electricity and 3,730,000 acre ft. of storage, and cost an estimated $305,000,000. Companies currently planning project are Mountain States Power Co., Pacific Power and Light Co., Portland General Electric Co., Washington Water Power Co. and Montana Power Co. Corps of Engineers has also proposed construction of Clearwater projects.

PLAN FIVE IDAHO PLANTS—McCall Farm Chemicals, Inc., of Walla Walla, Wash., is building plant in Craigmont at present, has purchased sites at Culdesac and Nezperce, and is planning another two plants for future construction at Grangeville and Lewiston. Company, which began operations last July, specializing in manufacture and sale of chemical fertilizers, now has four operating plants in Washington and Oregon.

HECLA EXPLORATION—Hecla Mining Co. enters agreement with Princeton Mining Co. to carry out underground exploration in Princeton's holdings in Coeur d'Alene district of Northern Idaho, in return for 60% interest in commercial ore discovered.

MONTANA

WILLISTON PIPELINE—Group of oil producers in Williston Basin commission Shell pipeline system to construct 1,000-mi. pipeline from Poplar, Mont., to Chicago, estimated to cost $130,000,000. Detailed studies of proposed line will be submitted by Shell next May. Committee representing oil producers is made up of Northern Pacific Railway Co., Placid Oil Co., Shell, Socony-Vacuum, Southern Production Co., Texas Co., Tide Water Associated Oil Co., Woodley Petroleum Co., and Murphy Corp.

NEW MEXICO

TO PRODUCE ACETYLENE — Banes Co. is building $35,000 steel building at Banesco Industrial Depot in Albuquerque to be leased by Big Three Welding Equipment Co. for manufacturing and bottling commercial acetylene. Big Three, a Texas firm, expects to begin acetylene operations in March. Company now manufactures oxygen in another building leased at the depot.

OREGON

WAX FROM DOUGLAS FIR—Processes developed at Oregon Forest Products Laboratory, Oregon State College, by Dr. E. F. Kurth, will be used in M. W. Kellogg Co. pilot plant to produce wax from Douglas fir bark. Kellogg Co., New York, is reported to have 5-year option for exclusive U. S. production and sales. Plant, to be located in southern Oregon, will produce an initial 3,000 lb. of wax, at estimated cost of $75,000, for distribution to consumers and evaluation.

BACK NEW FREEZER PLANT—Plans for new freezer plant at Corvallis are forwarded by Richard Powell, assistant plant manager of Western Oregon Packing Corp., and Robert Reiman, Modern Freezing and Storage Co. Production anticipated for this year is 100 tons of strawberries, 2,000 tons of corn and 10 tons of raspberries.

MODERNIZE—Pacific Carbide and Alloys Corp. begins $100,000 improvement program at its Portland plant, to include building alterations and changing its furnaces to use Soderberg continuous baking electrodes.

MORE COTTAGE CHEESE—Borden Co.'s Pacific Cheese division opens new cottage cheese plant at Portland, which will serve Washington and a large part of Oregon. Production is expected to reach 1,000,000 lb. of cottage cheese monthly. Borden's cottage cheese factory at Central Point will continue to supply southern Oregon and northern California.

UTAH

POWER PREDICTION—E. M. Naughton, vice president and general manager of Utah Power and Light Co., states utility will have to build another steam-electric generating plant in order to

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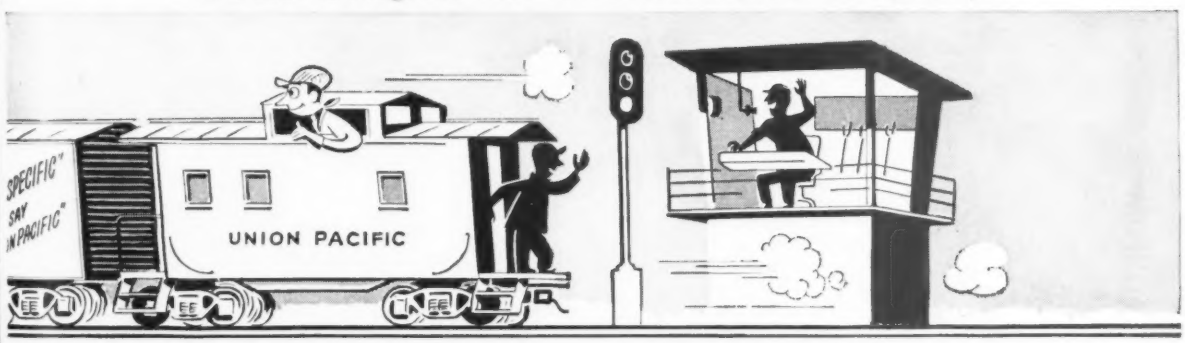

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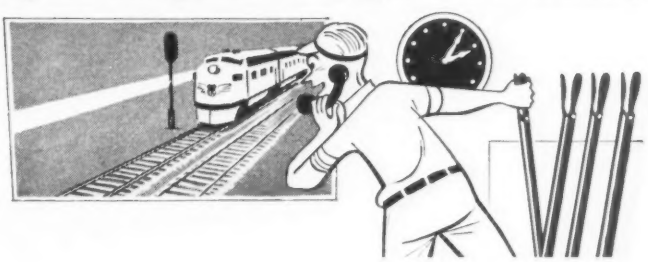

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NEW FIRM NAME—Mill Creek Chemical Co., Dallas, Tex., which plans to build anhydrous ammonia plant in Salt Lake City, changes name to Salt Lake Chemical Co. Project is backed by Glore Forgan and Co., New York investment bankers, Tears Engineering Co., and Henry C. Beck Co., both of Dallas. Prospective operators and owners have not been named.

UTEX TO BUILD MILL—Utex Exploration Co., Salt Lake City, will buy $3,272,500 stock held by minority stockholders, enabling company to proceed with plans for construction of $3,000,000 uranium mill at Moab. Minority stockholders opposed plan. Majority stockholder is Charles A. Steen, who discovered uranium claims in southeastern Utah which Utex is developing.

REFINERY ADDITION—Western States Refining Co. will add a $300,000 reforming unit, to raise octane rating of part of its gasoline production, at its North Salt Lake plant by May of this year.

PIPELINE TO CALIFORNIA — Utah Western Gas Co. is organized in Utah to extend gas pipeline from Clear Creek field to California state line, for delivery of natural gas to Pacific Gas and Electric Co.

STUDY AMMONIA PLANT—Monsanto Chemical Co., St. Louis, Mo., announces it is working closely with Utah Chemical Co. on development of ammonia plant using natural gas from Clear Creek field. Monsanto research men and engineers are working on plans for the multi-million dollar plant, and reportedly a decision will be reached soon, based on availability of raw materials and market for products of plant.

PROPANE TREATING—Salt Lake Refining Co., subsidiary of Standard Oil Co. of Calif., will build $155,000 propane treating and storage facility at its Salt Lake City installation. Plant upon completion in March will process for commercial use liquified petroleum gas now used as fuel in refinery operations. Tanks for storage of about 2,500 bbl. of liquid fuel are included in project.

ENLARGE WELLINGTON PLANT — Carbon-Dioxide & Chemical Co. begins building $150,000 expansion at its Wellington plant, which will increase production of dry ice from 40 to 75 tons daily. Later increase to 100 tons daily is anticipated. Addition is scheduled to be in operation by April 15. Expanded operations have been made possible by completion of new carbon dioxide well by Equity Oil Co. at Farnham Dome in Emery County, with daily output of 18,000,000 cu. ft.

WASHINGTON

G. E. PROPOSAL IS STUDIED—Admiral Lewis L. Straus, chairman of Atomic Energy Commission, states in letter to Richland Chamber of Commerce that AEC will require several months of study before reaching decision on proposal of General Electric Co. to build dual purpose reactor at Hanford Works.

HANFORD CONTRACT — Gaasland Co., Bellingham, is awarded $1,724,845 contract by Atomic Energy Commission to construct six underground tanks for storing waste from new chemical plant at Hanford Works. Each tank will have capacity of 1,000,000 gal. Contract includes related facilities.

TACOMA REFINERY — Washington Processing Co., backed by California, Texas and New York interests, completes financing plans for construction of $10,000,000 oil refinery in Tacoma. Plant, to have ultimate capacity of 25,000 bbl. daily, will be built on tide flats, with construction planned for early 1954. Port of Tacoma has awarded $686,000 contract to General Construction Co. of Seattle for dredging Industrial Waterway and filling a 102-acre plant site.

CHOOSE FLORIDA SITE—Aluminum Tubing Co., Spokane, will move its plant for manufacture of portable aluminum irrigation tubing to Jacksonville, Fla. Plant will be under supervision of Howard H. McCarl, vice president, and Kenneth S. Bayless, secretary-treasurer.

UNDERGROUND STORAGE—Van-Tor Oils & Explorations, Ltd., San Francisco, acquires underground reservoir near Blaine through purchase of majority stock of Pleasant Valley Oil & Gas Co., now a subsidiary of Van-Tor. The 3,700-acre property was acquired with a view to the entry of natural gas into the Pacific Northwest.

CONCRETE FIRMS CONSOLIDATE—Merger of five concrete products firms in western Washington with Graystone Concrete Products Co., Seattle, is agreed upon, involving Grays Harbor Cement Products Co., Aberdeen; Lewis Materials Co., Centralia; Everett Concrete Products Co., Everett; Graystone Materials Co., Olympia; and Mason Materials Co., Seattle. President of combined Graystone organization is F. M. Kettenring; W. S. Wilson, vice president and general manager; R. E. Metzger, vice president and Centralia manager; W. F. Paddock, secretary; and Mott Rieke, treasurer and controller.

HOWE SOUND CONTRACT—Howe Sound Co., Salt Lake City, contracts with General Services Administration to supply government in next two years a total of 18,700,000 lb. of copper from its Holden, Wash., mine, at 31½¢ lb. This is reportedly nearly 7¢ above prevailing price of metal.

FIRM PURCHASED — Pope Machine Co., Inc., Seattle, becomes subsidiary of Kling Brothers Engineering Works, Chicago, in capital stock purchase. New officers of Pope Co. are Arthur H. Heist, president; William C. Pope and Carl W. Kling, vice presidents, Alfred G. Kling, secretary and treasurer, and L. W. Sistig, assistant secretary and general manager. Pope Co. manufactures steel fabricating machinery.

SITE APPROVED — Washington Iron Works, Seattle, receives approval of Board of King County Commissioners to locate new $5,000,000 plant on 77-acre site north of Issaquah. Board upheld recommendation of County Planning Commission for rezoning area for industrial purposes. Opposition to rezoning came from sportsmen and residents of area.

FROZEN WHALE VENTURE—Pacific Sea Products, Inc., Aberdeen, is packing frozen whale meat under Moby Dick brand for use as animal food, with contract to buy all whale meat of British Columbia Packers, Coal Harbor, B. C. President of company is Otto Weissich and production manager Pat A. Conrad, who has explored field of whale meat use and availability. Firm, which is looking forward to a million-pound pack annually, may work out an agreement with Dutch and Norwegian whalers to supply meat through use of freezerships.

"AIR TRACTORS"—Central-Lamson Corp. is organized by Lamson Aircraft Co. of Seattle and Central Aircraft, Inc., of Yakima for production of special dusting and spraying airplanes, known as air tractors. Company, incorporated for $250,000, will begin production in existing facilities of Central Aircraft at Yakima municipal airport, building 12 of the new aircraft by May 1954 and another 50 by February 1955. Concern also has long-range plans of entering modification and development work on civilian and military large aircraft.

LANG PURCHASE—Lang & Co., Seattle food company, buys, effective December 31, National Restaurant Supply Co.'s sheet-metal plant in Seattle, to be operated as a division of Lang. National will retain Seattle warehousing facilities, and set up a sales and display office in Seattle, both serving its Portland operation.

WYOMING

SULFUR RECOVERY — Group of oil companies reach agreement on construction of plant to dehydrate natural gas for purpose of supplying proposed sulfur-recovery plant of Jefferson Lake Sulphur Co. to be built at Manderson, in north central Wyoming. Both plants will be constructed by Ralph M. Parsons Co., Los Angeles, with work to begin as soon as weather permits. Participating oil companies are Socony-Vacuum Oil Co., through its subsidiary General Petroleum; Gulf Oil Corp.; Stanolind Oil & Gas Co.; Sohio Petroleum Co.; Roy Booth Shannon Oil Co.; G. & N. Oil Co., and Mule Creek Oil Co.

PROPANE-BUTANE PLANT — Construction of $4,000,000 plant at Newcastle will begin in February for Homer S. Head Co. of Houston, Tex. Plant will produce propane and butane. A second plant of same type is being considered by Allen Enterprises, of Houston, provided sufficient acreage can be obtained there.

MAY BUY PIPELINE—Negotiations are reported to be under way by Murchison interests of Dallas, Tex., to purchase 225-mi. Plains Pipe Line Co. of Newcastle, and substantially expand and extend line. Operators are said to be restricting production of oil because of limited line capacity.

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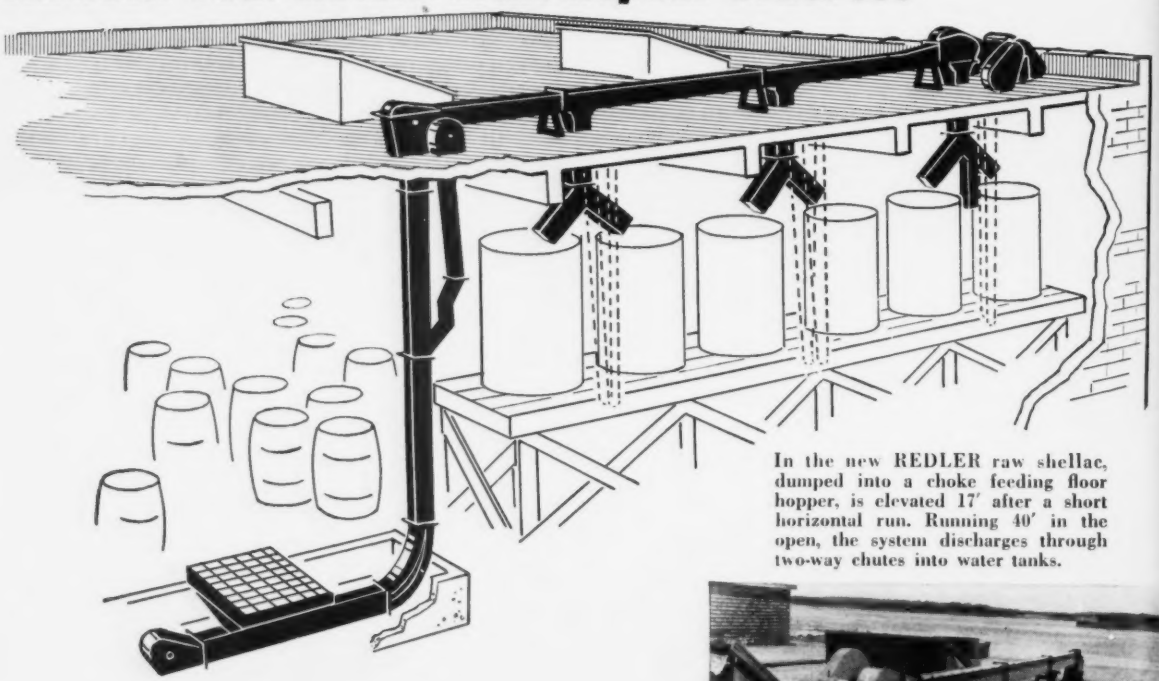

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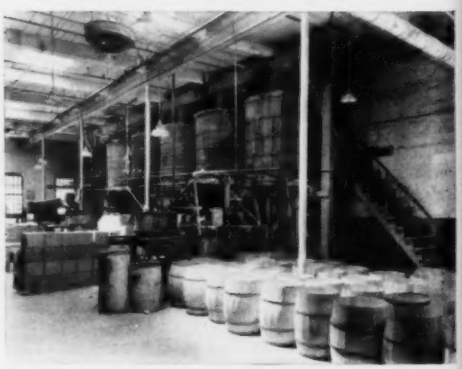

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